

The **Iron Age**

A Chilton Publication

How's the steel
warehouse
business?
See page 47

THE NATIONAL METALWORKING WEEKLY • JUNE 2, 1955



VALLEY MOULD & IRON CORP.

General Offices: HUBBARD, OHIO

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REPORT FROM

DANLY

15 years heavy handling "AROUND THE CLOCK" from 9 Whiting Cranes!

In 1940, Danly Machine Specialties, Inc., a leading manufacturer of mechanical presses, installed nine Whiting Overhead Electric Traveling Cranes in their Chicago plant. These cranes have been in operation practically 24 hours a day, six days a week, for fifteen years. All production moves via these cranes, and Danly depends on them to meet schedules without fail. This phenomenal record is the result of (1) Danly's program of specialized crane maintenance, (2) the foresight of Danly executives and Whiting engineers — working

together and planning the installations to meet *future* as well as present needs, (3) the outstanding features built into Whiting Cranes that assure peak performance at low cost. These features, to mention a few, include anti-friction bearings, precision-made gears, securely-fitted shafts and flanged couplings. Send for our new booklets — Unit 79 "How to Select A Crane" and Unit 80 "Presenting Whiting Cranes."

WHITING CORPORATION

15631 Lathrop Avenue, Harvey, Illinois



Cranes • Trambeam • Trackmobile • Chemical Processing, Foundry and Railroad Equipment



Crane wheels are one of the many types of products made from Bethlehem blanks. Here a wheel, bearing, axle, and coupling are being assembled at the plant of Whiting Corporation, builder of high-quality industrial machinery.

How to be sure of high strength in a circular forging

Strength is often the very first requirement in a heavy-duty circular part. Bethlehem forged-and-rolled circular blanks give you consistently high strength, *without excessive weight*.

How is this done? The answer lies in Bethlehem's unique process of manufacture. The steel blanks are not just forged, not just rolled, but *both* — in a most unusual mill that combines the steps as a single operation. The mill is thus able to produce a uniform product — one so strong that customers can often specify lighter blanks than they formerly used.

Bethlehem forged-and-rolled blanks are used

in gears, crane wheels, industrial wheels, turbine rotors, clutch and brake drums, sheave wheels, flywheels, tire molds, pipe flanges, and many other circular products. The blanks are available in sizes from 10 to 42 in. OD and can be furnished either heat-treated or untreated. For further details, ask for a copy of illustrated Booklet 216; it will be sent to you promptly without cost or obligation of any kind.

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On the Pacific Coast Bethlehem products are sold by Bethlehem
Pacific Coast Steel Corporation. Export Distributor: Bethlehem
Steel Export Corporation

BETHLEHEM STEEL



Starred items are digested at the right

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NEWS DEVELOPMENTS

WAREHOUSES JOIN THE STEEL SCRAMBLE—P. 47

There has been a marked pickup in steel warehouse business. See real inventory pinch developing by late June. Coil is the tightest item handled by the warehouses with plates rapidly getting scarcer. Pressure is also mounting on light structurals, stainless, and bars. Warehouses voice traditional complaint about not getting enough steel from mills.

STEELMAKERS HONOR FAIRLESS, TALK GROWTH—P. 50

At the American Iron and Steel Institute's general meeting, Benjamin F. Fairless was elected president and talk centered on expansion. Steelmakers spoke confidently of the future, pointing to growing American needs as the basis for steadily increasing industry facilities. Employment stability has been fostered by expanding steel product lines.

METALLURGY JOINS FIGHT AGAINST CRIME — P. 52

The Federal Bureau of Investigation conducted 240 metallurgical examinations during fiscal 1954. Well-equipped laboratory proves important tool in running down criminals and in investigating accidents due to metal failures. Theft, accident cases are detailed.

NO RELIEF FOR SMOG-BOUND L. A. — P. 64

Catalytic muffler not ready as smog reliever. Tests showed efficiency decreased after 2000 miles. But improvements may provide solution. GM's Surfactage has been adapted to medical science to register heart sounds not audible to stethoscope.

WHITE HOUSE WON'T MEDIATE STRIKES — P. 69

The Administration has quietly adopted a hands-off policy on labor-management conflicts. Unless national interests are at stake, there will be no federal intervention. Policy places added bargaining responsibility on company and union but is a healthy development.

WEST STEEL OUTPUT HEADS FOR RECORD—P. 73

Output of finished steel products by West Coast mills is up 17 pct over 1954, just a small amount behind record pace of 1953. Inventory rebuilding will help second half production. Only two minor products show drop in consumption. Sheets are up 20 pct.

MACHINE TOOL MEN MOUNT SALES ARTILLERY—P. 75

Machine Tool Show at Chicago looms as an all-out presentation of the sales case for machinery. Technical advances of recent years will be pointed up by exhibits and the theme of saving through mechanization will be driven home to expected record crowds.

ENGINEERING & PRODUCTION

CONTROL ANNEAL FOR GOOD COPPER TUBING—P. 87

Accurate control over annealing cycles will give the grain size uniformity and scale-free surfaces so essential to the drawing qualities of copper tubing. At one plant this has been achieved with modern furnaces and an exothermic type atmosphere generator.

AUTOMATIC STEAM PLANT USES WASTE FUEL—P. 90

Automatic controls keep Jones & Laughlin's new waste fuel-fired steam plant running smoothly and economically. Manual control is required only in case of an emergency. Major fuel is coke oven gas which was formerly wasted. Supplementary fuel is residual tar. Plant has three 60,000 lb per hour steam boilers.

IMPORTANCE OF HYDROGEN EMBRITTLEMENT—P. 92

Hydrogen absorption can permanently affect the ductility of cold worked steel. Gas content does not increase hardness but does alter the normal fracture pattern. Even aging cannot restore ductility appreciably. Effect on hot rolled material is not as severe.

"WHAT" AND "HOW" OF ANODIZED COATINGS—P. 95

Formation of an anodized coating on aluminum is a complex process. Its interpretation is further complicated by the aluminum composition and structure as well as the production of hydrogen in the pores. Relationships exist between breakdown resistance, anodizing time, coating thickness, current density and sealing of commercially pure aluminum.

NEW HIGH SPEED WELDER FOR WIRE MESH — P. 100

A new resistance welding machine produces wire mesh in widths up to 13 ft from continuous coils of 4 to 14-gage wire. It welds 60 cross wires a minute to as many as 79 longitudinal wires. Machine occupies 32 x 35 ft of floor space but is highly flexible.

MARKETS & PRICES

MOLYBDENUM FINDS WIDE NEW MARKETS — P. 53

Expanding markets in many fields widens use of molybdenum. Use as an alloying material for iron and steel will continue to take most of the output. But use in agriculture, as a lubricant, in chemicals and as a base material is also growing. New carburizing steel with molybdenum alloy is out of laboratory. Climax mine expands.

SOFT COAL MOVES FORWARD AFTER SLUMP—P. 54

Decline in soft coal production has been checked. For the first time since the peak year of 1947, the industry is showing increased output. Inventory adjustments account for part of the rise but coal is finding a solid market in steel, utility and other industrial applications. Better union relations leave mine operators in a position to handle rising needs. Decline in home heating market is leveling off. Limits in the nation's oil supply round out a bright long-range picture for the very long suffering coal industry.

NEW STEEL ORDERS EXCEEDING SHIPMENTS — P. 127

The rate of incoming steel orders continues to exceed shipments. Producers are still fighting a battle to put a dent in order backlogs. Virtual capacity operation for third quarter is assured. And some consumers are placing business for the fourth quarter. There is more talk about 1955 business establishing a new all-time record in production. No major consuming industry gives any sign of easing pressure on the mills. Steel demand will continue to be strong.

LOOKS LIKE TOP YEAR FOR TIN SHIPMENTS — P. 128

Tin plate mills have been operating at a terrific pace since the first of the year. Both domestic and foreign consumers have been pressuring for delivery. Current order pace indicates that the strong demand for electrolytic, hot dip, and black plate is likely to keep up for the rest of the year.

NEXT WEEK:

AUTOMATIC PLATING UNIT HAS JOB FLEXIBILITY

In terms of manhour requirements alone, this automatic furniture plating machine is producing 14 times as much work as previous methods—and this rate can be stepped up. Machine design is complete and flexible enough to allow quick conversion for other types of production work.

WHAT PURCHASING AGENTS ARE TALKING ABOUT

Meeting of the nation's purchasing agents in New York affords a good chance to find out what this important group is thinking and planning. Next week's special report will cover the meeting. It should present some interesting points on how summer buying will run and why. This is bread and butter talk.

AJAXOMATIC POURING UNIT

In Operation at Montrose Division,
BENDIX AVIATION CORPORATION



Photo shows installation of AJAXOMATIC Combined Holding Furnace and Automatic Pouring Unit in connection with die casting machine. In circle at right is shown a closer view of the spout from which uniform shots of molten aluminum alloy are ejected at exact time intervals by means of an electronic timer, which works with the accuracy of a lens shutter.

NOW completely automatic die casting of aluminum alloys is possible in smaller quantities than formerly, and at reduced cost. This fact should be of special interest to the manufacturer who has die casting machines in operation and is doing hand ladling. The unit is entirely sealed, the operator feels no heat, accident hazard is eliminated.

This small, compact AJAXOMATIC* unit will increase production of die castings by as much as 25%, because it delivers regular, uniform quantities of metal into the die casting machine with no delay, immediately after dies are closed. The spout itself is heated and the temperature of each metal shot remains constant.

*Trade Mark. Registered
U. S. Patent 2,674,940 and
Pending U. S. Patent
Applications

For further information send for descriptive folder

AJAX

TAMA-WYATT



AJAX ENGINEERING CORP., TRENTON 7, N. J.

INDUCTION MELTING FURNACE

AJAX ELECTRO-METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Hotchup High Frequency Induction Furnaces
AJAX ELECTRIC CO., The Ajax Mullgren Electric Salt Bath Furnace
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THE

NEW

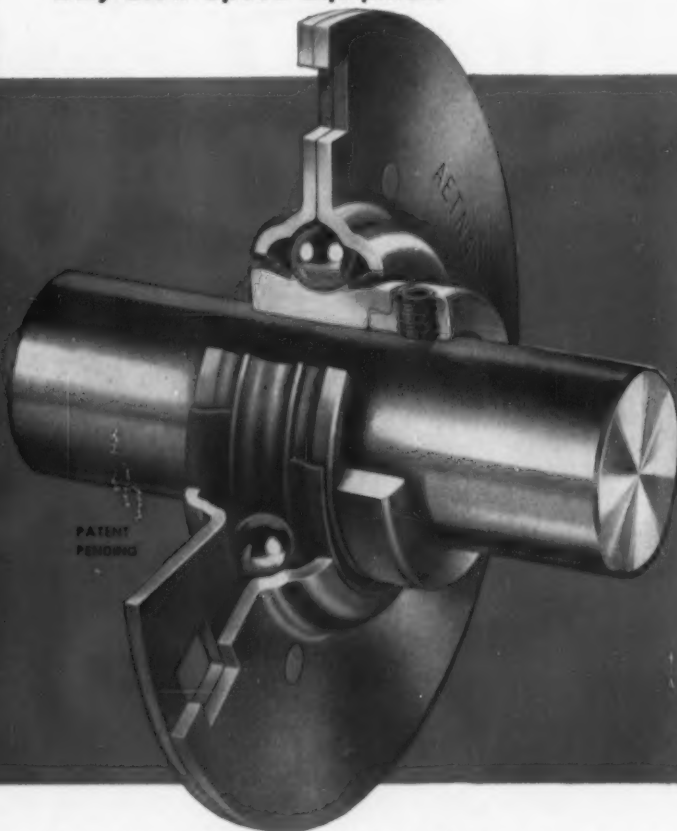
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SAVES MONEY

SAVES TIME

SAVES SPACE

FEWER PARTS • Simplified, compact, space-saving design. Flange and outer bearing race—ALL-IN-ONE. Full ball complement. No retainer.

EASY MOUNTING • Package construction—needs no pre-installation adjustments, fitting or reassembly. Eccentric locking collar for easy, quick mounting without auxiliary positioning devices,

without shaft shouldering or machining.

PRE-LUBRICATED • Generous, factory-packed lubricant chamber assures maximum life and operating efficiency, minimum servicing.

EXCLUSIVE SEALS • Dirt-proof, leak-proof, one-piece Buna-N seals (of Aetna-originated design) are self-contouring, free-running, self-aligning, corrosion and rust-free;

provide positive contact under all conditions of misalignment.

SELF-ALIGNING • Compensates for shaft or structural member deflections and misalignment. Takes radial, thrust or combined loads.

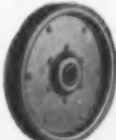
RUGGED DURABILITY • Inner and outer races case hardened for high fatigue and shock load resistance. Heavy gauge pressed steel housing.

OTHER AETNA LOW-COST BEARING UNITS

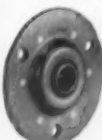
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Sprocket
Idler
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Unit



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if you make
appliances



you should
know about

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More and more of the nation's appliance manufacturers are turning to Sharon for such special steels as: *Sharonart*, the rolled-in design steel — *Sharon Stainless*, with the finest finish in the industry — *Deep Drawing Alloys*, of consistent high quality and uniformity — *Galvanite**, an improved hot dip zinc coated steel.

In fact, when it comes to special steels to improve product design or quality, it pays to come to Sharon, prime producers of special steels for the automotive, appliance and allied industries for more than 50 years.

SHARONSTEEL

Appliance Manufacturers

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430-STAINLESS — a complete review of a popular straight chromium grade.

GALVANITE* — The story of one of the most popular hot dip zinc coated steels.

SHARONART* — Rolled-in design steels with excellent illustrations.

*Trademark registered by Sharon Steel Corporation

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Offices, 100 E. 42nd St., N. Y. 17, N. Y.
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Indexed in the Industrial Arts Index
and the Engineering Index.



Editorial:

The Leopard and His Spots

♦ ONCE AGAIN millions of Americans—and Western Europeans—are yearning for peace. And once again this feeling gives rise to false hopes and wishful thinking.

It is too bad that in order to fight the diplomatic and propaganda battle abroad we may lull our own people to sleep. What we say to the world means one thing—we do want peace but not at any price. What some of us interpret it to mean might be something quite different.

No matter how much Mr. Dulles and President Eisenhower might caution against too much optimism there are millions who think that real peace is just around the corner.

Such a national frame of mind means that we will have to fight to keep strong. We will have to explain and explain why we need air bases, why we need more nuclear weapon experience, why we need a big armed force and why we can't take a Communist sigh as a signal that they love us like brothers.

It seems as if we are attaching too much of our domestic fervor and proselyting spirit to the recent Russian moves. We may feel that because of our strength the Communists are really worried; or that their power is lessening in their own country.

That isn't the case at all, based on past history. A hoodlum can be nice as pie when he wants something. A hardened criminal can love his mother like the Bible says he should and go right out and shoot down someone else's mother without a moment's hesitation.

We have not learned—despite what the President says—to see the Reds as they really are. Everything they are doing and saying now has one purpose—to disorganize the free world, to cause friction, to neutralize our strength and eventually to cause Asia and Europe to join the Communist world.

This is the time to tell your Congressman, your President and your friends to keep up the guard, to increase our air strength, to speed more and better research and to spike any grandiose dreams that the "great day" is here. It is a long way off.

A meeting at the "summit" is nothing more than a free world searching party to see if the leopard has changed his spots. He seldom does, except in fairy tales.

Tom Campbell

EDITOR

STEP UP Metal-Sawing Production in ALL of 7 ways:



• The New No. 2-B Automatic Motch & Merryweather Circular Sawing Machine.

1. LESS TIME
2. LOWER TOOL COST
3. MILLED FINISH
4. BURRLESS ENDS
5. NEGLIGIBLE WASTE
6. PERFECT PARALLELISM
7. ACCURATE LENGTHS

THE MOTCH & MERRYWEATHER

Triple-Chip
METHOD

DOES JUST THAT!

CAN YOU EQUAL THIS **{ TIME COST }**
BY ANY OTHER METHOD?



Material —
S.A.E. 1020
Cutting time —
54 seconds

Tool cost per
piece — \$.019

IMPORTANT: Re-sharpening costs and all other tool costs are included.

THE
MACHINE TOOL
SHOW
CHICAGO, ILL.
SEPT. 8-12, 1955
INTERNATIONAL AMPHITHEATRE



ALWAYS — it's your cost per cut that counts. To determine that cost, all seven yardsticks listed above must be applied. You must increase usable production, get uniform accuracy, and reduce sawing costs. The Motch & Merryweather Triple-Chip Method out-performs and out-saves all others in the sawing of metal. Let us convince you.

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MACHINERY MANUFACTURING DIVISION
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Builders also of Production Milling,
Vertical Turning, Automatic and Special Machines

THE IRON AGE

dear editor:

letters from readers

Why Write Editorials About...?

Sir:

I have just run across your editorial of April 7 and can't help but make a few comments. I always read your editorials and think they are all right. I would prefer to read your editorials on any subject than one of our local newspapers. My suggestion would be to keep up the good work. *C. L. Liebau, President, Federal Malleable Co., Milwaukee.*

Abrasive Cleaning

Sir:

Your item on abrasive cuts cost of cleaning die castings appearing in Newsfront of May 5 is of interest to us. May we have additional information about the process and the name of the company which has it? *G. W. Markes, Chemical & Metallurgical Engineering Dept., Automatic Transmission Div., Ford Motor Co., Livonia, Mich.*

Further information may be obtained from the American Wheelabrator & Equipment Corp., 451 So. Byrkit St., Mishawaka, Ind.—Ed.

Blast Cupola

Sir:

Would you kindly send me tear sheets of the article "Metallurgical Blast Cupola Offers Improved Melting Efficiency" which appeared in the April 21 issue of THE IRON AGE. *B. C. Yearley, Engineering Asst. to Vice-President, National Malleable & Steel Castings Co., Cleveland.*

Nuclear Energy

Sir:

On p. 69 of the May 19 issue, under Newsfront, you have reference to a cell that converts nuclear energy directly to electrical en-

ergy having been developed by one company.

We would appreciate being advised the name of the company to which you have reference. *F. H. Smith, President, Smith Tube Corp., Ridgewood, N. J.*

The cell has been developed by Patterson-Moos & Co., Inc., 90-28 Van Wyck Expressway, Jamaica, New York.—Ed.

Newsfronts

Sir:

I would appreciate additional information on the following subjects listed in your April 14 issue under Newsfront: "Microfilming Saves Storage Space" and "Use Magnesium for Jig Castings." *L. M. Shusterich, Buyer, Convair Div., General Dynamics Corp., San Diego, Calif.*

Microfilming item is abstracted from Mar. 14-18 ASTE paper by J. A. Cotto. Jig castings item is from ASTE paper by R. L. Nelson, Mar. 14-18. Copies may be obtained from the American Society of Tool Engineers, 10700 Puritan Ave., Detroit 38, Mich.—Ed.

SAP Process

Sir:

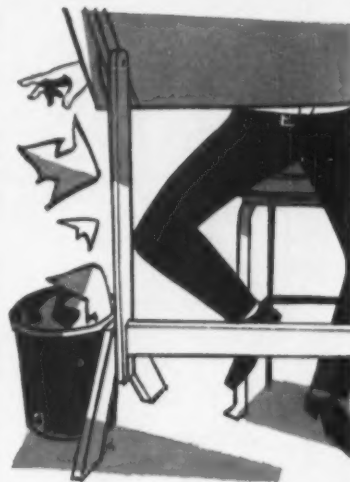
It would be most appreciated if you would send the writer two tear sheets of the article "SAP—Retains Properties After High Temperature Exposure," pp. 104-106 of the April 28 issue of THE IRON AGE. *N. W. Bass, Vice-President, The Brush Beryllium Co., Cleveland.*

Titanium Behavior

Sir:

It would be greatly appreciated if you could send us two tear sheets of the article entitled "How Titanium Behaves at High Temperature," which appeared in your March 24 issue on p. 96. *L. J. Barron, Specialty Products Section, E. I. duPont de Nemours & Co., Wilmington, Del.*

Before You Give Up...



consider a ball



Your wastebasket knows how a design job is going... "You're on the wrong track," it says when it looks like the one above. "You need a fresh approach."

"Maybe you should consider a ball..."

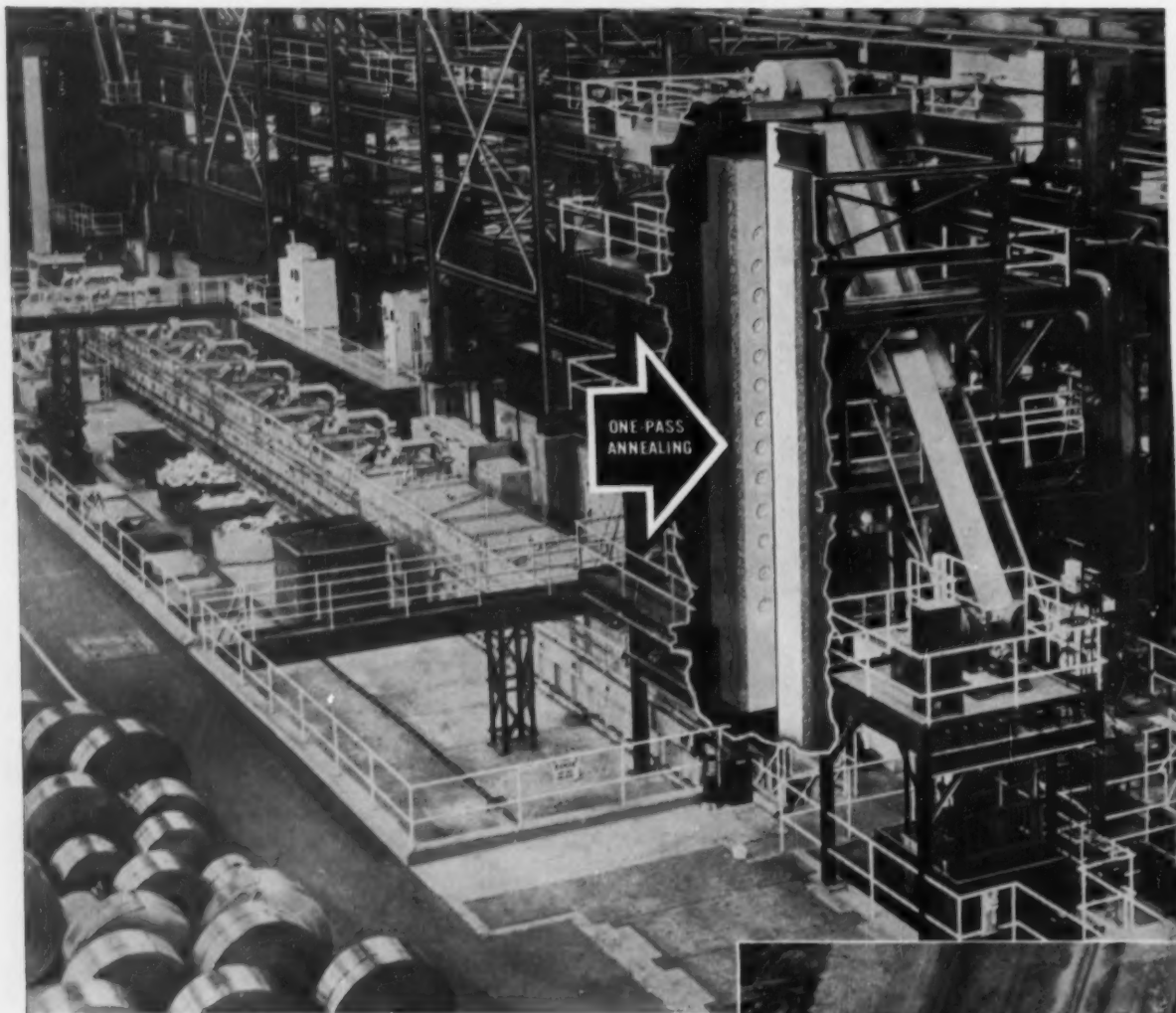
A Universal ball. A Universal ball so tiny you can hardly see it. Or a Universal ball as big as a golf ball. There's a size for every need—including the new demands for today's new uses. For these days, designers and manufacturers are continually coming up with new products and new jobs for balls in every industry in the country.

From smallest to largest, Universal balls are as perfectly round as long experience, close quality control, and skillful workmanship can produce. Tolerances within 10-millionths of an inch. And we can supply just about any kind of metal you wish.

Next time your wastebasket starts working overtime, and you see where a ball might make an "impossible" job possible, call us in. Maybe we can help.

Universal Ball co.

WILLOW GROVE
MONTGOMERY CO., PA.



Galvannealed to Bend 180° Without Separation

THIS continuous bright annealing-galvanizing line uses SELAS GRADIATION strip annealing to obtain tight adherence of coating and high quality of product. Two new galvanizing lines scheduled for this year will also rely on Selas radiant-gas-burner heating . . . precisely applied . . . unsurpassed for uniformity across strip width.

- Compact, single-vertical-pass design saves valuable floor space . . . avoids rolls in heated section and accompanying maintenance and product quality difficulties.
- Elimination of externally-prepared atmosphere in heating section cuts operating costs.

- Precise thermal control assures reproducible uniformity regardless of gauge variations.

Selas heat processing is also used in low temperature preheat prior to galvanizing . . . delivering the strip bright and clean to the galvanizing bath.

Improved product quality, increased heating speed and lower costs are likewise achieved with GRADIATION strip heating in tin reflow and in annealing of both ferrous and nonferrous metals.

Write for descriptive literature on strip annealing.



SELAS

**CORPORATION OF AMERICA
PHILADELPHIA 34, PA.**

fatigue cracks

by William M. Coffey

Puzzlers

Today we will try to catch up on puzzler answers. If that doesn't fill this tired old column, then we'll slip in a tired old joke at the end. (Incidentally, our house is sold, so please turn off the spigot before we get ideas and go into Real Estate).

Cannibal & Missionary Puzzler, Apr. 14. Answer:

M—missionary

C—cannibal, the two who cannot row

C/r—cannibal who can row

- (1) C and M row over, M rows back
- (2) C and C/r row over, C/r rows back
- (3) 2 M row over, M and C row back
- (4) M and C/r row over, M and C row back
- (5) 2 M row over, C/r rows back
- (6) C and C/r row over, C/r rows back
- (7) C and C/r row over—all 6 are now on other side.

Mrs. Frank E. Wocel, secretary to a steel forgings salesman, gave us the above solution. We can't see anything wrong with it and neither can R. W. Shank, International Harvester Co.; H. A. Hanson, Liberty Powder Defense Corp.; R. B. McCready, Alliance Machine Co.; Donald Surprenant; Alex J. Wertis; John N. Moore, Mildred Chapman; Mrs. Olive Pendley; A. J. Reardon, Remington Rand; Dolly Langdon, Lone Star Steel Co.; H. M. Moll, Consolidated Mining and Smelting Co. of Canada; and we'll "salute" Charlie and the Club, too, because of the nice pictures of the cannibals and the kind words. Mr. T. J. Campbell, who submitted the puzzler, has another solution and we can't see anything wrong with that either. Keep sending the money.

Mr. McKinley's puzzler about the 10-digit multiplied by the 9-digit (April 28), up and down,

comes to 123456789876543210, by gosh. Winners: Roy A. Badt, Junior Steel Co.; Charles F. Darling, Alling-Lander Co.; Marion Oswald, Hiller Helicopters; N. L. Starr, Packard Motor Car Co.; Margaret Borgan and Delores Arch, National Tube; L. G. Bayrer, Atwater Mfg. Co.; R. W. Shank, International Harvester Co.; H. Halets and R. Green, American Steel and Wire; Austin H. Phelps, U. S. Engineers Corps; and Mr. C. M. Houston who can argue with Mr. McKinley about another "9" that could be in the middle of this long group and other things. And we'll send Mr. Houston's letter to Mr. McKinley. All we care about is the money. Please keep sending it.

About that walled city puzzler (May 12), the answer seems to be 4.828 miles in diameter, even though Mr. Boysel, Gary Steel Works, cheated and didn't send us the answer when he sent the puzzler. Winners (unless Mr. Boysel says no dice): Alfred Shyne, Gates Craig and Harry Davis, Gaston Dyeing Machine Mfg. Co.; J. F. Robinson, U. S. Steel; Wm. E. McCord; L. T. Jensen, Torit Mfg. Co.; R. B. McCready, The Alliance Machine Co.; Mr. A. B. Retallick (aside to Mr. A. B., the house is sold, thanks); C. W. McKinley, of course, A. C. Spark Plug; L. G. Bayrer, Atwater Mfg. Co.; and here right now on this stage we will throw a compliment to Mr. J. Carlin, Head Proofreader of the Chilton Co. for a good try—

Another New Puzzler . . .

. . . comes from the "former" worst metallurgist east of the Mississippi who started with that other pig latin thing; translate this:

ABCD IRN AJS
YMRUNT IRN AJS
SAR2 IRN AJS

. . . and that's the best we can do for today.

a report on METALWORKING OPPORTUNITIES

in Manitoba, Canada

from a recently completed
impartial survey*

Products and subgroups of the metalworking industry which offer opportunities to Manitoba producers include: cutlery, copper and brass products, hand and power tools, hardware and fittings, metal fastenings, athletic and sporting equipment, metal containers, instruments, jewelry and silverware, oil well equipment, household goods and appliances, sheetmetal products, castings and forgings, electrical machinery and equipment, industrial equipment and parts, office equipment, farm and construction equipment and supporting industries.

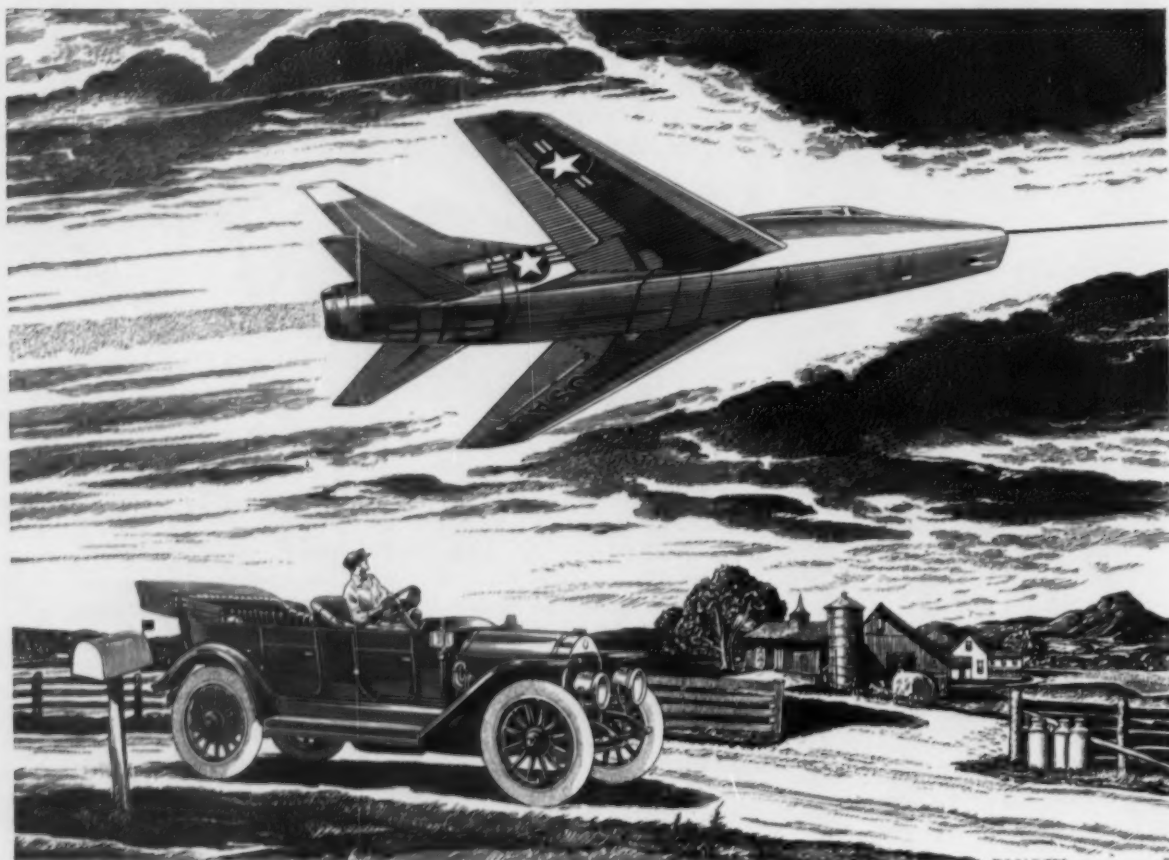
Manitoba's central location in the Prairie region of Canada makes it an excellent manufacturing and distribution center for the Prairie Provinces and Western Ontario. Low-weight, high-value items can also be economically distributed to the national and export markets.

*Name of the research company with a copy of its report will be mailed on request to interested and responsible parties.

MANITOBA DEPARTMENT OF INDUSTRY & COMMERCE

Dept. 1A, Legislative Building
Winnipeg, Canada.

From the Stoddard-Dayton to the Super Sabre



**Speco's creative engineers have opened
new horizons in precision!**

If you recall the Stoddard-Dayton, then surely you remember the Jenny — the sweetheart of World War I. They were a couple of kids who "grew up together" . . . the car and the airplane. And today their grandchildren are the mainstays of our national economy.

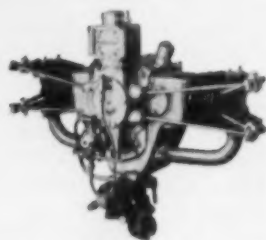
We like to feel that our leadership in precision on a mass production basis has played a big role in this growth. Our work in all industries—automotive, aviation, industrial . . . in fact, in all fields of

mechanics and hydraulics — has made great contributions. Our team of precision engineers, toolmakers and machinists makes certain that *If We Ship It . . . It's Right!* If you have a job with which you feel we might help, a short letter or a telephone call will bring prompt, sound guidance. Or if you'd like the whole SPECO story—from plant to people to products, send for our new Plant Brochure. The Steel Products Engineering Company, Springfield, Ohio.

**THE STEEL PRODUCTS
ENGINEERING COMPANY**



BEAUTIFUL 11" x 14" REPRODUCTIONS OF THIS PICTURE SUITABLE FOR FRAMING WILL BE SENT ON REQUEST—FREE.



One of our early contributions to aviation—this two cylinder, Opposed Piston Blower Engine produced by Speco in 1924.



Today we're building precision mounts for nearly every major manufacturer of radar equipment—and many other component parts.

dates to remember

JUNE

ELECTRIC METAL MAKERS GUILD, INC.—23rd annual meeting, June 2-4, Hotel Fort Shelby, Detroit, Mich.

AMERICAN GEAR MANUFACTURERS ASSN.—Annual meeting, June 5-8, The Homestead, Hot Springs, Va. Association headquarters are at One Thomas Circle, Washington, D. C.

GENERAL ELECTRIC COMPANY—3rd annual Welding Show, June 8-10, Municipal Auditorium, Kansas City.

EXPOSITIONS

BASIC MATERIALS EXPOSITION—May 31-June 2, Convention Hall, Philadelphia. Show management: Clapp & Pollak, Inc., 341 Madison Ave., New York.

MATERIAL HANDLING INSTITUTE—June 5-8, Public Auditorium and Exhibit Hall, Cleveland.

AMERICAN ELECTROPLATERS' ASSN.—42nd annual exposition, June 20-23, Cleveland Public Auditorium, Cleveland.

MACHINE TOOL SHOW—Presented by National Machine Tool Builders' Assn., International Amphitheatre, Chicago. September 6-17, inclusive. This is the first industry-wide showing since 1947 of the advances in machine tools.

AMERICAN WELDING SOCIETY, INC.—Spring meeting, June 7-10, Hotel Muchiebach, Kansas City. Society headquarters are at 33 W. 39th St., New York.

SOCIETY OF AUTOMOTIVE ENGINEERS—Golden anniversary summer meeting, June 12-17, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J. Society headquarters are at 29 W. 39th St., New York.

EDISON ELECTRIC INSTITUTE—Annual meeting, June 13-16, Los Angeles. Institute headquarters are at 420 Lexington Ave., New York.

RADIO - ELECTRONICS - TELEVISION MANUFACTURERS ASSN.—Annual convention, June 14-16, Palmer House, Chicago. Association headquarters are at 777 Fourteenth St., N. W., Washington, D. C.

INTERNATIONAL CONFERENCE ON COMBUSTION—June 15-17, Kresge Auditorium Building, Cambridge, Mass.

AMERICAN SOCIETY OF TRAINING DIRECTORS—11th annual conference, June 15-17, Los Angeles.

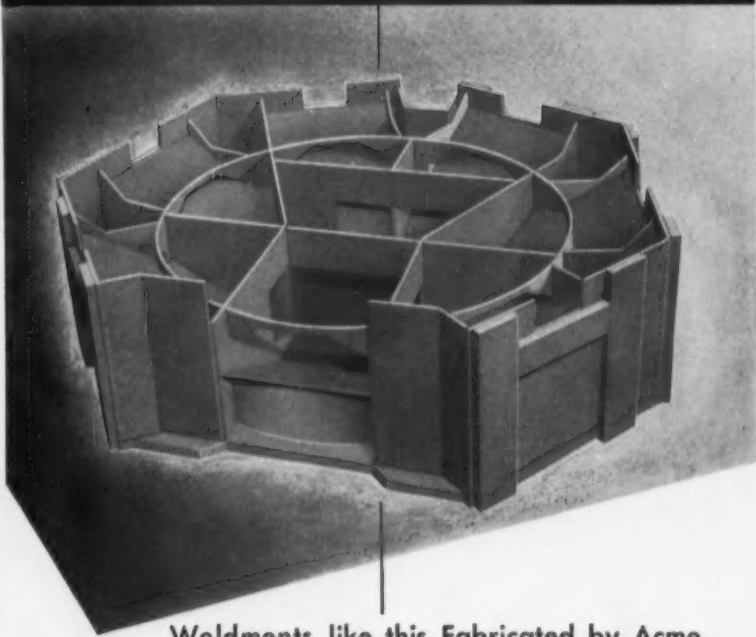
MALLEABLE FOUNDERS' SOCIETY—Annual meeting, June 16-18, The Greenbrier Hotel, White Sulphur Springs, W. Va. Society headquarters are at Union Commerce Bldg., Cleveland.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—19th annual applied mechanics conference, June 16-18, on the campus of Rensselaer Polytechnic Institute, Troy, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Diamond Jubilee semi-annual meeting, June 19-23, Statler Hotel, Boston. Society headquarters are at 29 W. 39th St., New York.

AMERICAN ELECTROPLATERS' SOCIETY—42nd annual convention, Cleveland Public Auditorium, Cleveland, June 20-23.

ANOTHER MACHINE TOOL BASE THAT "couldn't be welded"



Weldments like this, Fabricated by Acme excel in Strength, Rigidity, and Precision Finish . . . save Weight and Cut Costs. No Design is too complicated . . . not even Yours!

In Doubt? Ask for Bulletin B-3
"The Facts about Weldments and Castings"



ACME WELDING

DIVISION OF THE UNITED TOOL & DIE CO.

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A.S.M.E. U68-U69 Qualified Welders • A.P.I. - A.S.M.E. Approved
Underwriters Label & Inspection Service • X-Ray Facilities • Navy Approved
National Board Approved • Hartford Steam Boiler Inspection Service

STEEL

STAINLESS STEEL

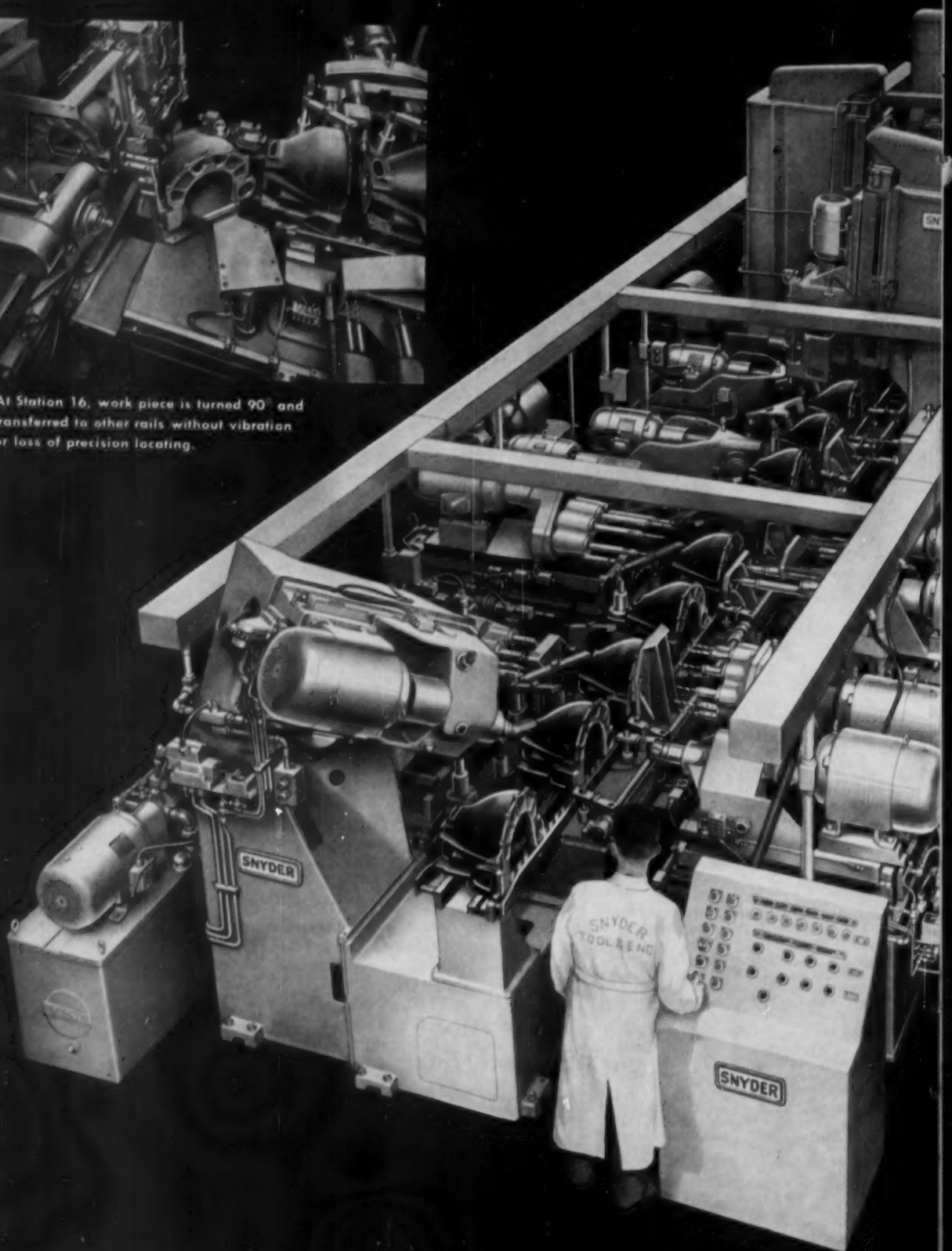
EVERDUR

ALLOYS

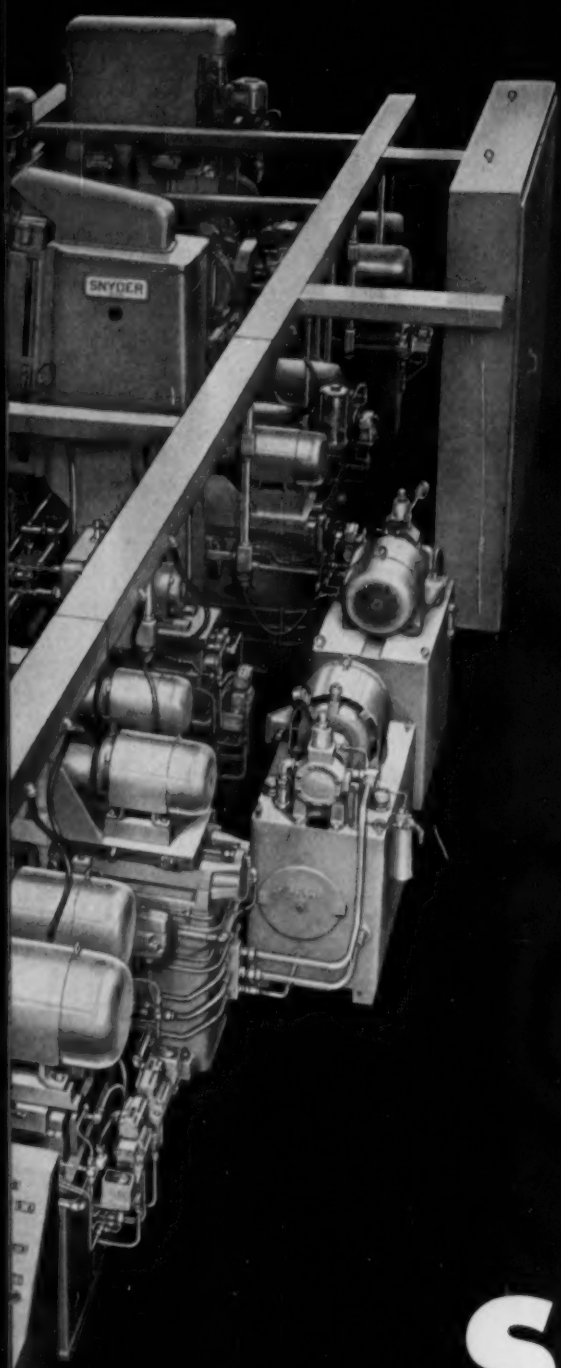
SNYDER-AUTOMATION



At Station 16, work piece is turned 90° and transferred to other rails without vibration or loss of precision locating.



LEADER FOR 30 YEARS



Presents

SNYDER SPECIAL

22-STATION automatic transfer machine for processing cast iron clutch housings; which drills, rough and finish bores, mills, saws, taps, spot-faces, counterbores and chamfers, performing a total of 110 operations on various surfaces or holes of various dimensions. Production, 124 cycles an hour at 80% efficiency.

UNUSUAL FEATURES: At Station 1, a 2" breather hole is trepanned from solid metal and finish bored with one tool. At Stations 8 and 9, a section of transfer rails cam-linked to milling units, drops to bring work piece into line with cutters. At Station 16, work piece is turned 90° and transferred to other rails without vibration or loss of precision locating.

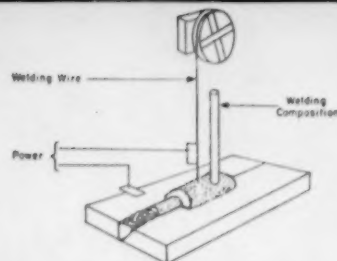
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TOOL & ENGINEERING COMPANY
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UNIONMELT Welding Solves "Impossible" Casting Job . . .



UNIONMELT welding solved the problem when a manufacturer was unable to make one-piece castings of compressor cylinders used in gas line pumping stations—other welding methods proved too slow and costly . . . UNIONMELT welding cuts 40 hours in production time, and produces high-quality welds that easily withstand pressure of 750 lb. per sq. inch.

The 42-in. diameter cylinder is cast in two halves, and has an internal piston bore with surrounding suction and exhaust chambers . . . The 2½-in. thick piston walls and 3-in. thick outer walls of each half are aligned and UNIONMELT welded.

Like many other products throughout industry, these

cylinders are being fabricated faster and more economically than ever before, because UNIONMELT welding offers:

- Higher welding currents than other welding processes . . . Up to 4,000 amperes . . . Joins metal of any thickness.
- Greater economy—½ to ¾ less welding wire . . . Also uses larger-diameter, less-expensive wire.
- Use of any power supply—a.c., d.c., or constant potential . . . With c.p., no control is necessary to maintain constant arc voltage—welding is fast and more easily controlled.

Start saving now—call your local LINDE representative for more information and ask for Form 7942, "Modern Methods of Joining Metals."

Linde Air Products Company A Division of Union Carbide and Carbon Corporation

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The terms "Linde" and "Unionmelt" are registered trade-marks of Union Carbide and Carbon Corporation.





Which package is best for you?

ROEBLING HIGH CARBON WIRE is packaged in many ways...and for every kind of usage there's one particular type of packaging that will bring top handling and production efficiency...new economy in your plant. For certain wires, Roebling's new large-size reels or new disposable spoolless cores have special money-saving advantages:

The large reels are ideal for long runs. They reduce down time to a minimum.

The new spoolless core (a hollow fibre core without flanges) abolishes the storing and return of empty spools...eliminates charges for spools and waiting for credits.

You *pay* for the best when you buy high carbon wire. Make sure you *get* it in wire and packaging. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

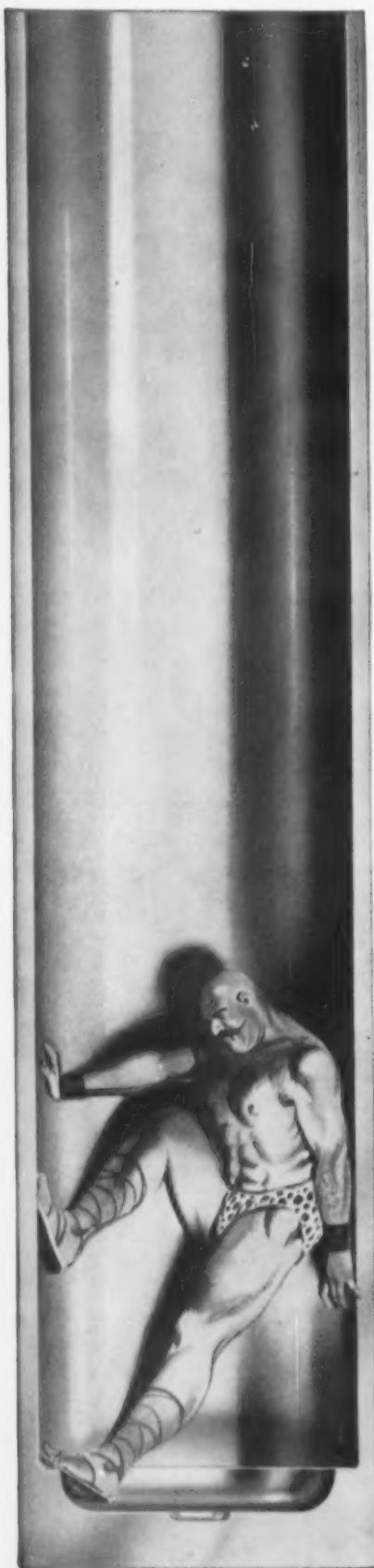


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Subsidiary of The Colorado Fuel and Iron Corporation

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Could you wrap up 3000 psi a BETTER way ?

• The Mullins *Koldflo** Process *cold extrudes* this accumulator shell, which operates at 3000 psi, and withstands 12,000 psi burst pressure. For high-pressure service in hydraulic starting systems, this one-piece design is ideal. It eliminates assembly of forgings and tubing required with conventional designs, eliminates an O-ring seal as well.

Extruded with integral end to finished dimensions, *Koldflo* accumulator shells can wrap up *your* pressure problems better—and at less cost! If you require precision cylindrical steel parts in high volume, give us your specifications, and quantity required. We'll be glad to show you how *Koldflo* can turn your new designs into new and better products.

Mullins Koldflo extrudes this 4½" diameter accumulator shell in one piece. These extrusions can be furnished in a variety of shapes and sizes and with a choice of mechanical properties. Tolerances are extremely close as made. Surface finish measures 60 RMS or better, depending on shape.



"How would you tool-up to make an egg?" For copy of informative new booklet, write Koldflo Division, Dept. A-6, Mullins Manufacturing Corporation, Warren, Ohio.

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impossible to machine long parts
AUTOMATICALLY on your present equipment?

IT'S EASY...IT'S ECONOMICAL

with a **GREENLEE**

SIX-SPINDLE BAR

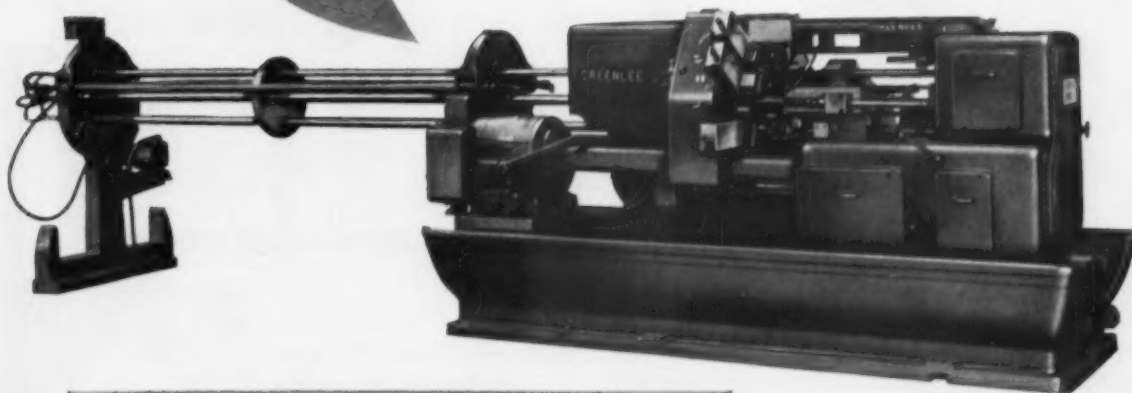
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This machine puts you in an enviable competitive position. Production goes up... costs go down. Check its many advantages:

(1) Feeds out stock to 24" (2) Has multiple feed-out (3) Eliminates stock scoring (4) Reduces stock reel noise (5) Eliminates stock pushers and feed-out cams. Especially worth noting is the fact that the stock can be fed out in one or more positions during either the index cycle or feed cycle.

Additional data will gladly be sent on request. Write today.

Here are some typical examples of work done on this machine. Pieces up to 24" can be handled easily... at fast speeds.



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COMPLETE INFORMATION

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Controlarc

MAGNETIC AMPLIFIER-RECTIFIER

FULL TIME,



INDIVIDUAL CONTROL of both current and voltage

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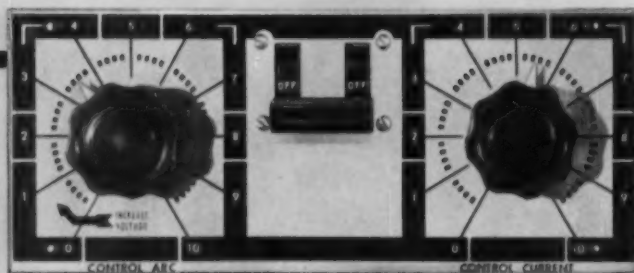
PATENTED VICKERS MAGNETIC AMPLIFIERS

CONTROLARC automatic control is made possible by the patented Vickers Self-saturating Magnetic Amplifier with exclusive voltage-sensing, feed-back control circuits. Constantly analyzing welding voltage and automatically adjusting welding current to arc changes, Vickers Magnetic Amplifier maintains ideal arc characteristics, through the entire welding range, under all welding conditions.

**VOLTAGE and
CURRENT
INDIVIDUALLY
CONTROLLED...**



Only Vickers Controlarc offers complete remote control of both voltage and current through the entire welding range. The operator never has to go to the welder to change range switches or taps. Two separate dials individually control voltage and current.



Separate, complete control of both voltage and current makes it possible to set any volt-ampere combination within the output range of the particular Controlarc model being used—from minimum voltage at minimum current to maximum voltage at maximum current.

DC Welder

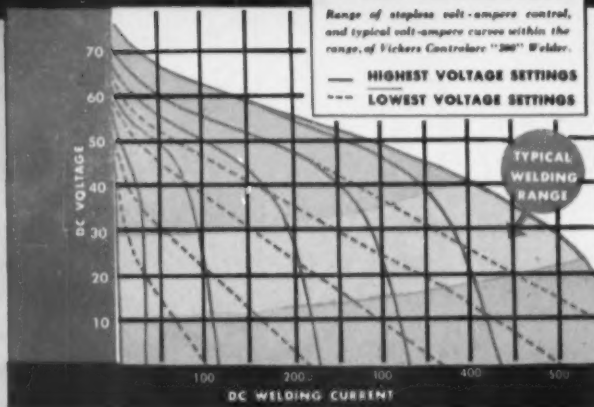
200
300
400

AMPERE MODELS

AUTOMATIC ARC CONTROL

FULL RANGE VOLTAGE CONTROL

... separate from current control, makes it possible to choose the exact arc characteristic for every job and every welding condition. Controlarc full range, stepless voltage control is not limited to a few "average" settings, with blind spots in between. With Controlarc voltage control, the weldor not only can select the arc characteristic for a basic welding position—flat, overhead or vertical—but can pinpoint the setting to his personal preference for the particular condition under which he is welding.



ELECTRICAL SPECIFICATIONS and RATINGS

The Vickers CONTROLARC DC Arc Welder is rated in accordance with NEMA Standards for Rectifier type arc welders.

RATINGS					ELECTRICAL PERFORMANCE				
Rated Amperes at 40 Volts Load, 60% Duty Cycle	Amperes Welding Current Range		Primary Amperes Input per Phase		RATED AMPERES	AT RATED LOAD			
	Minimum at 20 Load Volts	Maximum at 40 Load Volts	230 Volts	460 Volts		PRIMARY KVA	PRIMARY KW	EFFICIENCY %	POWER FACTOR %
200	3	250	42	21	200	16.5	11.6	69	71
300	6	375	62	31	300	24.7	17.4	69	71
400	12	500	84	42	400	33	23.2	69	71

VICKERS CONTROLARC DC WELDER Construction Features

DOWNDRAFT COOLING

No "vacuum cleaner" floor dust pickup

RUST PROTECTED

Interior surfaces zinc chromated

RECTIFIERS

Conservatively rated for long life. Special finish protects from corrosive atmospheres

SEALED-IN LUBRICATION OF FAN MOTOR BEARINGS

DUCT COOLED TRANSFORMER
Air ducts in windings for high-efficiency cooling

CONCENTRATED WEIGHT

Low center of gravity

SKID MOUNTED

Portable mounting available



NO MOVING CORES OR COIL ASSEMBLIES
NO GEAR OR OTHER MECHANICAL DRIVES
ALL PARTS QUICKLY AND EASILY ACCESSIBLE

TERRITORIES OPEN FOR QUALIFIED DEALERS. WRITE FOR DETAILS.



VICKERS ELECTRIC DIVISION



Inc. a unit of The Sperry Corporation

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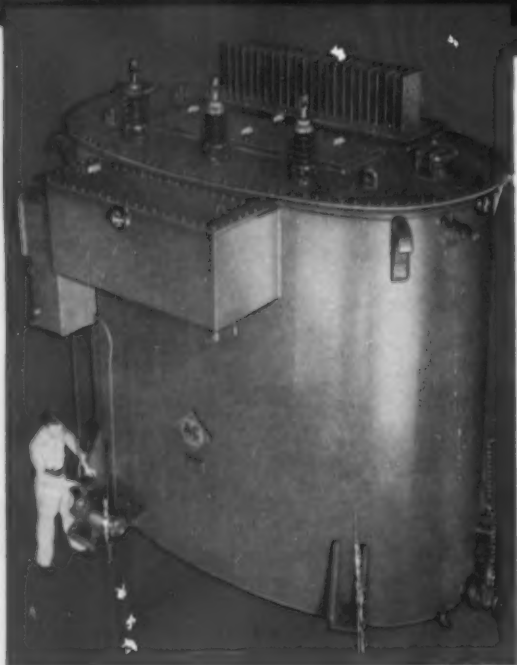
Reduce Cost of



TRANSFORMERS

Well-balanced design and extra-heavy duty construction are used in the Allis-Chalmers arc-furnace transformer. Past records show ability to withstand as much as 25 to 30 years of the repeated daily short circuits encountered in furnace operation. Extremely heavy supports and structure are used to brace coils against the severe short-circuit stresses.

Skillful insulation techniques protect windings from overvoltage due to wide tap range. Some units are designed for as much as 50% range in secondary voltages. Tap-changing mechanism, specially designed for arc-furnace transformers, is in separate compartment to facilitate maintenance. Wide flat contacts provide the long life needed for numerous daily tap-changing operations.



ALLIS-

THE IRON AGE

Arc-Furnace Steel

Use Allis-Chalmers Integrated Electrical Equipment—and you...

SAVE on Engineering — Allis-Chalmers steel mill specialists coordinate equipment, submit single complete package proposal.

SAVE on Purchasing — One order, one invoice, one follow-up for the complete furnace electrical system.

SAVE on Installation — All components are matched for easy installation. Delivery is coordinated to prevent delays.

SAVE in Operation — All equipment is designed and built to work together. One reliable supplier guarantees performance of complete electrical system.

TAKE ADVANTAGE of Allis-Chalmers complete line of arc-furnace equipment—transformers, *Regulex* control, switchgear, associated controls—backed by 45 years of experience. Call your nearby Allis-Chalmers District Office for assistance when you are planning new facilities or modernization. Or write Allis-Chalmers, Milwaukee 1, Wisconsin.

Regulex and Ruptair are Allis-Chalmers trademarks.

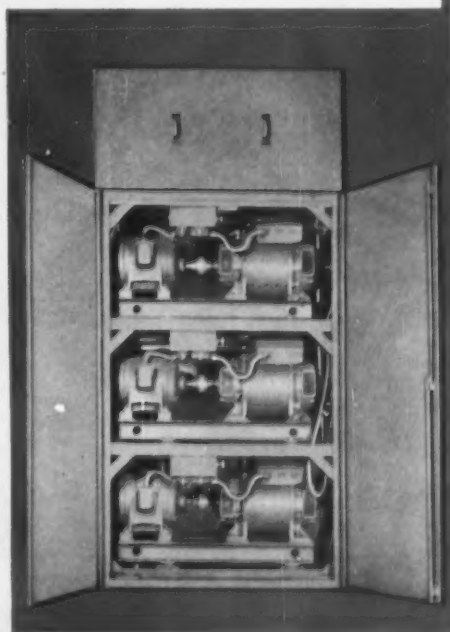
A-4742

REGULEX CONTROL

Balances arc current with arc voltage almost instantly—maintains desired arc conditions by automatically varying distance between electrode and charge.

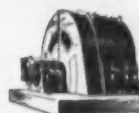
With *Regulex* rotating amplifier there are no contacts or switching devices between the regulator and electrode motor. Continuously closed circuit provides constant positive control, minimizing current surges, cutting power consumption.

Simple design of *Regulex* results in lower maintenance. Provisions for spare unit mounted on top assure continuous operation under all conditions. Tier construction — open or enclosed — conserves valuable floor space.



CHALMERS

Other Allis-Chalmers Equipment for the Steel Industry



Wide Range of Motors for main mill and auxiliary equipment drives—ac or dc—from 1 hp to 10,000 hp—and supporting m-g sets or rectifiers.



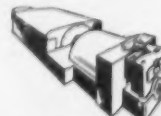
Transformers for mill service include metering transformers, distribution transformers, power transformers, and unit substations.



Switchgear ranges from low voltage metal-enclosed units to large metal-clad types — includes *Ruptair* and oil circuit breakers. Also large power circuit breakers.



Blast Furnace Blowers are a part of the A-C line of single and multi-stage blowers, axial and rotary compressors, and vacuum pumps for the steel industry.

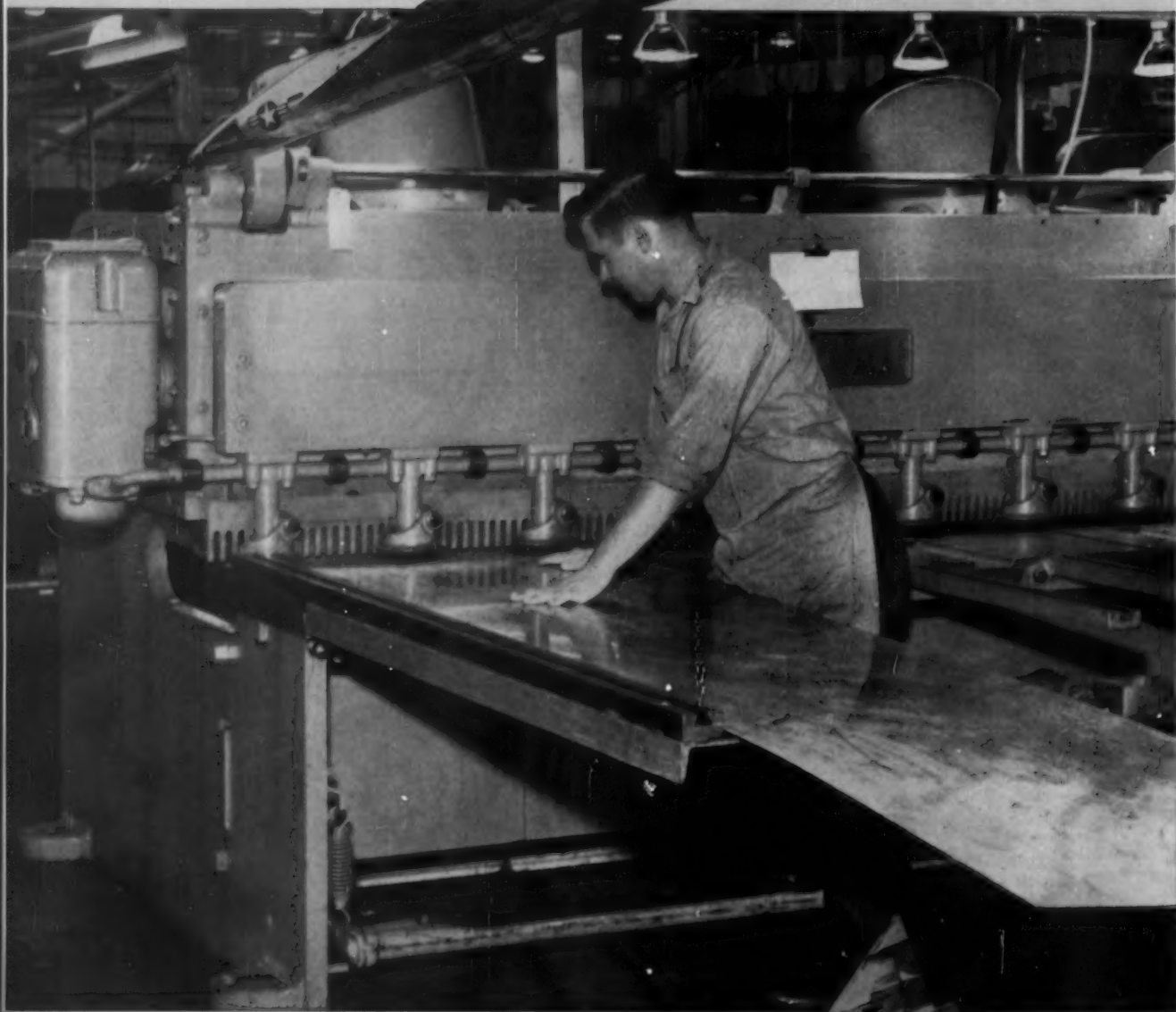


Power Generation Equipment includes steam turbine-generator units 2000 kw and larger for fluctuating steel mill loads. Also condensers, pumps and auxiliary-drive motors.



CINCINNATI Shears at

meet terrific



Materials being sheared in these illustrations are .093 Nimonic and .080" 5510 stainless steel.

Photos courtesy Pratt & Whitney Aircraft, East Hartford, Connecticut and Convair, San Diego, California.

PRATT & WHITNEY AIRCRAFT

demand for jet aircraft engines . . .



The right tools for the job were needed at Pratt & Whitney Aircraft, in their tremendous expansion, in the production of the highest power turbojets.

Cincinnati Shears are used in this program. Their accurate performance and ability to shear a wide variety of materials decided their selection.

Investigate:

- Cincinnati "Single Clearance" shearing
- Cincinnati Hydraulic Holddowns
- Cincinnati All-Steel Interlocked Construction

Write for complete Shear Catalogue S-6.

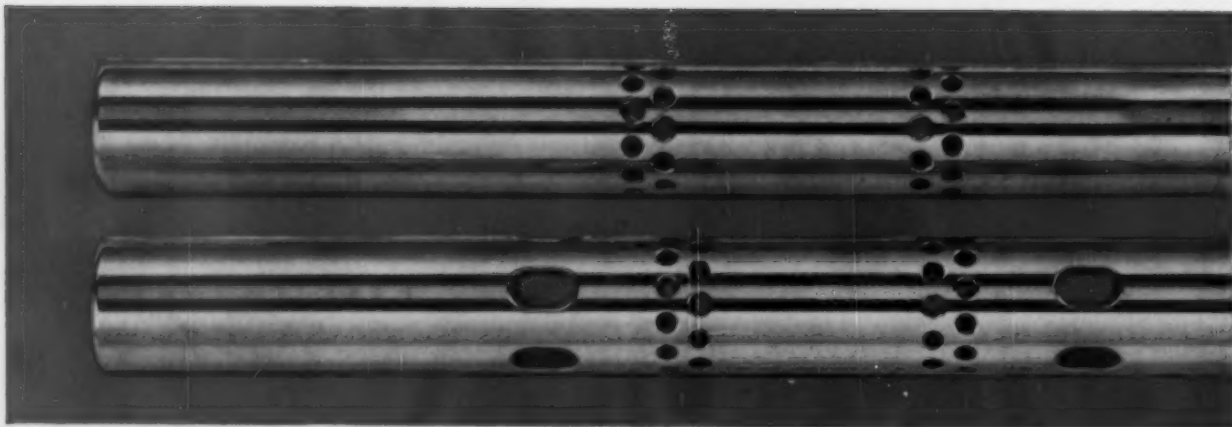


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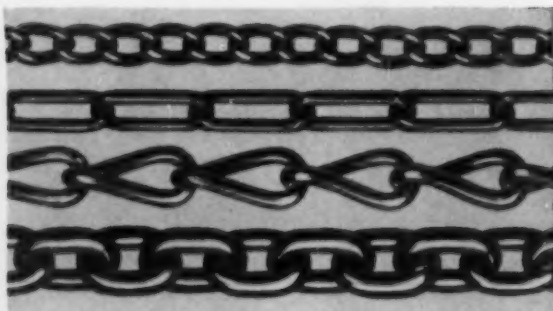




Free-machining ENDURO®



MACHINING COSTS WERE REDUCED on these automobile door hinges when they were made from Republic Hot Rolled Carbon Special Sections. The component parts were cold formed by broaching. Tapping and drilling were the only other machining operations necessary. You can apply this economical method of mass producing steel parts where the section conforms to the predominating cross section of the part. Republic supplies hot rolled special sections in carbon, alloy and stainless steels.



FOR HOISTING, HOLDING, HAULING, TOWING, BUNDLING, you can count on Republic Chain for greatest safety and dependability. Republic's Round Chain Division makes a complete line of welded and weldless chain for every industrial requirement—every type of fitting, attachment and accessory. Strategic location of Republic Chain plants and warehouses assures you of prompt delivery.

REPUBLIC STEEL CORPORATION
3104 East 45th Street,
Cleveland 27, Ohio



Please send more information on:

- ☐ Free-Machining ENDURO
☐ Hot Rolled Bars

- ☐ Chain
☐ Lockers

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E-6124



THE WORLD'S LEADER IN LOCKERS, Republic's Berger Division offers a wide selection of standard steel lockers for every industrial use. Modern design assures full-time protection for personal property. Handles are tamper-proof, cannot be removed. Continuous door strikes along sides prevent insertion of tools for prying. Berger offers a complete locker planning, engineering and installation service.



helps control costs on highly machined stainless parts

These stainless steel plungers for pneumatic and hydraulic control valves require 30 separate machining operations in producing them. Costs could be expensive. But the manufacturer controls them by using Free-Machining ENDURO Stainless Steel Bars.

Republic's Union Drawn Division produces cold drawn bars with a fine surface finish, close tolerance, accuracy of section, uniform soundness for fast, economical production on highly machined parts like these. Free-Machining ENDURO provides the added strength and corrosion-resistance of stainless steel. Two grades, A.I.S.I. 416 and 430-F, are fully 90%

as machinable as Bessemer Screw Stock.

Thus, you can apply the high physical properties and corrosion resistance of stainless steel to your duplicate steel parts—and still maintain economical, automatic production—by switching to Free-Machining ENDURO.

Republic ENDURO Stainless Steel is available in all forms, including hot rolled bars, special sections and wire. Republic metallurgists and engineers will give you expert assistance on applications, processing and use. Specify ENDURO on your next order for stainless steel bars. Mail the coupon for more information.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

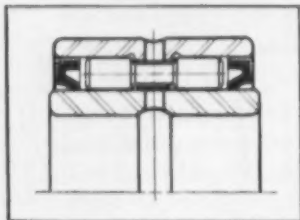
KLOZURE* OIL SEALS



USED IN THE FIRST
SEALED FULL TYPE
ROLLER BEARING



Above: McGill's new sealed Guiderol** bearing with two built-in springless KLOZURES, Model 71-A. Left: The Model 71-A has a narrow cross section consisting of a molded synthetic rubber sealing member securely bonded to and integral with a metal case.



Two springless KLOZURES, lips turned in, on Guiderol bearing provide life-time retention of lubricant. For re-lubricating at high pressures other sealing arrangements (with lips turned out, with one lip in and one out, and single seals) are available with these bearings.

*Registered Trademark

**Trademark of the McGill Manufacturing Co., Inc.

In developing their new sealed Guiderol bearing, the designers of McGill Manufacturing Co., Inc., (Valparaiso, Ind.) required a dependable grease seal which could be built into the unit *without* increasing the overall bearing size.

Springless KLOZURE Model 71-A proved to be the answer! For here was a proven grease seal of narrow cross section specifically designed for limited space applications. Here, also, was a trouble-free seal which would keep out dust and retain the lubricant for the *life of the bearing*.

There's a service tested KLOZURE model for every bearing application. Let us show you how Garlock KLOZURES can solve your sealing problems. Just call the Garlock office nearest you or write for KLOZURE Catalog 10.

THE GARLOCK PACKING COMPANY, PALMYRA, N. Y.

Sales Offices and Warehouses: Baltimore • Birmingham • Boston • Buffalo • Chicago • Cincinnati • Cleveland • Denver • Detroit • Houston • Los Angeles • New Orleans • New York City • Palmyra (N.Y.) • Philadelphia • Pittsburgh • Portland (Oregon) • Salt Lake City • San Francisco • St. Louis • Seattle • Spokane • Tulsa.

In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.



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THE ALLEN-BRADLEY LINE

MANUAL CONTROLS



DRUM SWITCHES



REDUCED VOLTAGE



Bulletin 600
Starters for frac. hp motors. Automatically stop overloaded motors



Bulletin 609
Manual across-the-line starter



Bulletin 350
Wide variety of drum controllers up to 500 hp



Bulletin 640
Manual resistance starter



Bulletin 646
Manual autotransformer starter

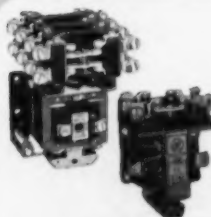
AUTOMATIC CONTROLS



SOLENOID STARTERS



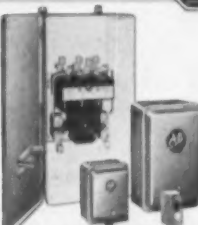
COMBINATION STARTERS



Bulletin 700
Over 300 types of solenoid relays—1 to 8 poles



Bulletin 702-704
Full line of solenoid contactors in 9 sizes up to 900 amperes



Bulletin 709
Starters up to 300 hp, 220 v; 600 hp, 440-550 v



Bulletin 712
With manual disconnect



Bulletin 713
With circuit breaker

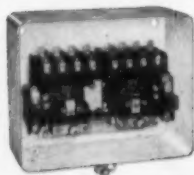
AUTOMATIC CONTROLS



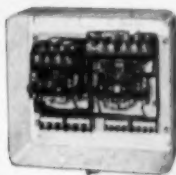
RESISTANCE STARTERS



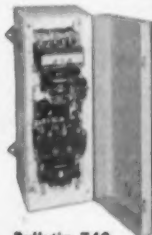
AUTOTRANSFORMER STARTERS



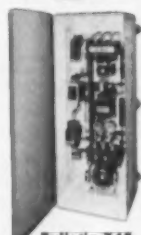
Bulletin 705
Reversing switch with overloading relays



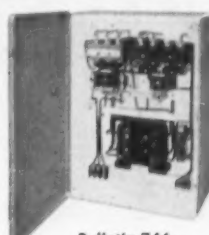
Bulletin 715
Multi-speed starters for 2, 3, & 4 speeds



Bulletin 740
2-Step automatic resistance starter



Bulletin 742
Stepless automatic resistance starter



Bulletin 746
Automatic reduced voltage autotransformer starter

ACCESSORIES



LIMIT SWITCHES



PUSH BUTTONS



Bulletin 848
Dashpot timer



Bulletin 849
Pneumatic timer



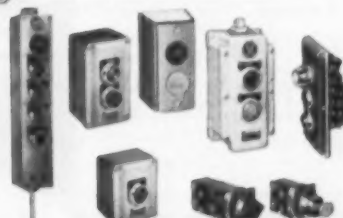
Bulletin 850
Motor-driven timer



Bulletin 802
Limit switch



Bulletin 802T
Oiltight limit switches



Bulletin 800-800T Push Buttons
Hundreds of standard, heavy duty, and oiltight push buttons, and pilot lights

For complete information on the Allen-Bradley line, please write for the A-B 120-page Handy Catalog.

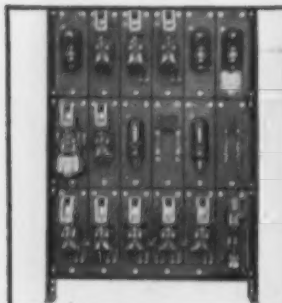
ALLEN-BRADLEY
SOLENOID MOTOR CONTROL

QUALITY

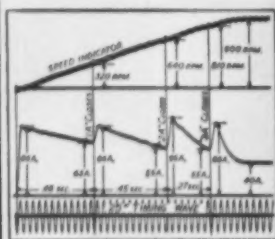
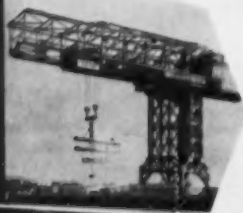
Write to

Allen-Bradley Co.
1341 S. First St.
Milwaukee 4, Wis.
In Canada—
Allen-Bradley Canada Ltd.
Galt, Ont.

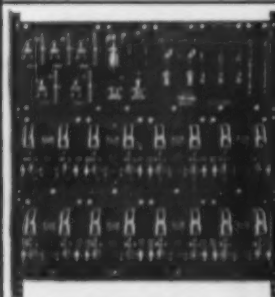
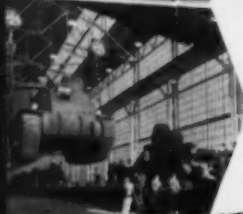
Earned... a reputation for
engineered control for
every make
and type
of crane



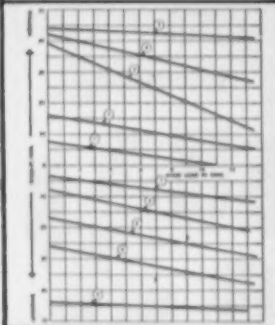
EC&M Wright Circuit Dynamic Lowering Controller is a simple, easily understood, completely safe system for D-c Cranes.



EC&M Frequency Relays accelerate A-c motors smoothly. They also accurately control plugging and speed-limiting functions.



EC&M Contratorque Control for A-c Bucket Cranes improves operation with faster get-away . . . wider speed selection . . . smoother stopping.



EC&M Eddymag Hoist Control for A-c Cranes provides precise hook speeds for precision handling.

When crane control problems are tough, experienced crane users turn to EC&M. They know that the extra margin of safety and accurate engineering result in quick, efficient operation, lower upkeep costs and freedom from delays.

At EC&M, the control for every crane is "specific". The crane data sheet serves as the blueprint for matching control equipment to actual crane loading. Relay-settings . . . resistor fillings . . . contactor sizes . . . and brake windings are designed to assure top performance.

Make it a point to specify EC&M Control for your next crane.



THE ELECTRIC CONTROLLER & MFG. CO.

4498 Lee Road

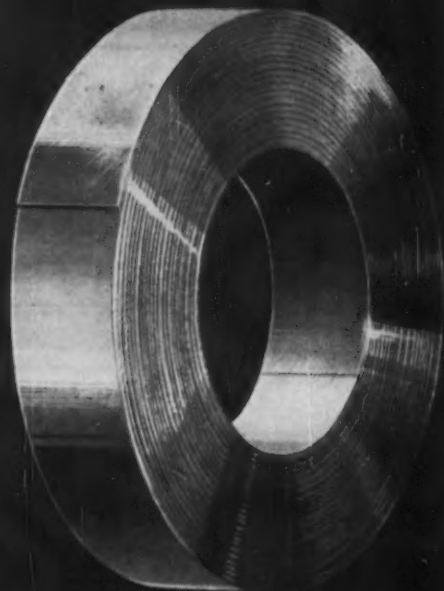
Cleveland 28, Ohio

WEIRTON

COLD-ROLLED STRIP STEEL

Also available —

HIGH-CARBON STRIP, N-A-X HIGH-TENSILE STRIP



Sentries of Quality

Weirton mills are blanketed with "sentry stations." From these outposts, the quality and uniformity of Weirton steel is guarded and guided by constant control.

From stations located throughout the mills, samples of materials are periodically carried to the Quality Control Laboratory by special pneumatic tubes. Here, complex analysis, checks and tests are made simultaneously by chemists, metallurgists and engineers, who use the most up-to-date equipment. Based on their findings, directions are flashed by telautograph and two-way radio to the men on the job.

This network of fast-acting controls is one more way Weirton maintains strict high quality and uniformity of its cold-rolled strip steel, along with the many other types of steel it makes. It is one more important reason why you should call Weirton the next time your plans call for cold-rolled strip steel.



WEIRTON STEEL COMPANY
Weirton, West Virginia

NATIONAL STEEL CORPORATION



This is a plain Ruff-L-Buff after wearing off about one inch in testing operations and then trimming. Loose threads, broken material and numerous small holes due to excessive heat and abrasion of the cloth are apparent.



30%

LONGER BUFF LIFE

The Binderized Ruff-L-Buff shown here was subjected to the identical test undergone by the untreated buff — yet look at the difference! Notice the absence of thread or cloth breakage of any kind, proof of Binderizing's effect on buff life.



with New H-VW-M Binderized* Ruff-L-Buffs®

Not just "another type of buff", but a revolutionary new H-VW-M process which impregnates the entire Ruff-L-Buff with the same organic binder used in buffing compounds. From these new "Binderized" Ruff-L-Buffs come a host of practical, cost-cutting advantages, proved over many months in actual production line operations.

Item by item, these are the six major advantages of the H-VW-M Binderized Ruff-L-Buff.

- **Longer buff life** — damage from overheating eliminated by pre-lubrication of buffing material, preventing excess frictional heat caused by constant flexing. This additional buff life has averaged 30% in actual test runs.
- **Better compound adherence** — the binderizing impregnation creates an affinity between buff and compound. The compound does the cutting, not the buff.
- **Faster cutting action** — more compound is retained on the buff, insuring an even cut for a longer period without re-application of compound.
- **Extended composition life** — additional binder in the cloth ensures better abrasive adhesion, longer life of both composition and buff.

- **Heading-up time** — new wheels require only application of the compound to be ready for immediate operation.
- **Cooler running** — in addition to pre-lubrication, six holes in the center and twelve air channels in the center rim provide a forced air circulation over all cloth surfaces.**

And, of course, Binderized Ruff-L-Buff retain such important features as *bias-cut cloth* to prevent unravelling, *perfect buff balance* for uniform rotation and wear, and *exclusive Red-E-To-Use face* that takes compound without need for surface preparation.

H-VW-M bias-cut Sisalweev buffing wheels are also available in Binderized types.

* Patent Pending
** Patent No. 2,140,208

For complete information on H-VW-M Binderized Ruff-L-Buffs and other specialized buffs write for Bulletin No. B-102.

PLATEMANSHIP

Your H-VW-M combination — of the most modern testing and development laboratory — of over 80 years experience in every phase of plating and polishing — of a complete equipment, process and supply line for every need.

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H-VW-M

INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES

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The Cities Service Heat Prover Works Here



THE PORTABLE HEAT PROVER is supplied and maintained free by Cities Service. It helps control combustion efficiency by allowing rapid, continuous sampling, simultaneous readings and direct measurement of oxygen and combustibles. Inland uses the Heat Prover for its blast furnaces, open hearths, soaking pits, continuous galvanizing line, reheat furnaces, purging operations, annealers, and boilers on ore ships.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

A SPECIAL REPORT ON PROTECTIVE FINISHES FOR ALUMINUM

Most aluminum producers and fabricators are well aware of the superiority of chemical finishes over anodizing for the protection of aluminum from corrosion. Naturally, then, there is a running battle for acceptance among the leading producers of the protective chemical finishes.

That's why, here at Allied, we have always studied your needs with regard to both our own and competitive processes. We're constantly trying to produce new and better finishes because we believe there's always room for improvement . . . even to our own products. Some years ago this policy led to the introduction of a process, long in development, that offered you a way to overcome anodizing's obvious technical complications . . . Iridite #14. This finish was far easier to use than anodizing, yet provided comparable, if not superior, quality. And, its cost was much less than anodizing.

But other finishes offering similar advantages over anodizing have entered the market. So . . . the current battle for acceptance. By any cost comparison Iridite #14 is the most economical. However, corrosion tests by users show contradictory results as to performance from Iridite #14 and other leading protective finishes for aluminum. Most tests show Iridite #14 superior, but some do not. The margin of difference, however, is always small. The truth is that all have proved good. However, our laboratory research indicated that still further improvements could be made.

That knowledge . . . plus our aim to give you even better protection and maintain the leadership of the industry, is exactly why Allied Development Engineers have been working for long years to develop a better finish than any of those now available, including our own Iridite #14.

Now the new finish is ready for you. It's called Iridite #14-2 (Al-Coat).

From a performance standpoint, Iridite #14-2 gives you two important advantages in the protective finishing of aluminum.

FIRST: in its fully colored brown film stage it provides corrosion resistance decidedly superior to previous processes.

SECOND: the basic brown film can be hot water bleached to produce a clear-type film with protection heretofore unobtainable from clear-type chemical finishes.

From an operating standpoint, new Iridite #14-2 gives you three important advantages.

FIRST: it provides consistently

higher corrosion resistance for different aluminum alloys treated in the same bath.

SECOND: it provides a more uniform appearance for parts of different alloys and with varied surface finishes before treatment.

THIRD: its operating and technical characteristics are superior to those of other processes.

If you are using or planning to use a chemical finish for aluminum, you should have full details on new Iridite #14-2. Write us or send samples for free test processing. Or, for more immediate advice, call your Iridite Field Engineer. He's listed under "Plating Supplies" in your classified telephone book. - - - ALLIED RESEARCH PRODUCTS, INC., 4004-06 EAST MONUMENT STREET, BALTIMORE 5, MARYLAND.

P. S. Even new Iridite #14-2 will be constantly measured against both your needs and competitive processes to make sure you get the best possible, most economical finish for your product that man and the laboratory can develop.



WELDMENTS of "T-1" Steel—made with AWS 12013 low hydrogen coated electrodes and without pre- or post-heating—develop the full 90,000 psi yield strength. As a result, lightweight designs are completely safe and reliable.

NEW USS "T-1" STEEL has great potential for reducing cost of pressure vessels

You've heard of Operation "T-1." You've heard how those dramatic tests proved that, when and if higher design stresses are permitted, USS "T-1" constructional alloy plate steel will make possible larger, stronger pressure vessels, vessels that can be built more easily and at lower over-all cost. As a result of Operation "T-1," several major pressure vessel fabricators have requested approval from the ASME to use USS "T-1" Steel in unfired pressure vessels. Why? For mighty good reasons:

"T-1" Steel has a very high yield strength — 90,000 psi minimum — three times that of conventional plate steels now used in pressure vessels. Yet it is extremely tough and can withstand high stresses and pressures even at temperatures far below zero. What's more, USS "T-1" Steel remains strong at high temperatures up to as high as 900 degrees F.

Yet, "T-1" Steel is easy to fabricate. It can be drilled, machined, or cold formed, and welded or flame-cut *without* pre- or post-heating. **"T-1" can make pressure vessels . . .**

LARGER. For a given pressure and shell thickness, the *radius* of a vessel may be increased in direct proportion to the ratio of working stresses. Result: more storage capacity at lower cost.

STRONGER. For a given radius and shell thickness, the *pressure* may be increased in proportion to the ratio of working stresses. Result: vessels for higher pressures at lower cost.

LIGHTER, EASIER TO BUILD. For a given pressure and radius, the shell thickness may be reduced, thus permitting larger vessels to be fabricated *without stress relief*. Result: lower fabrication cost.



United States Steel, Room 4666
525 William Penn Place, Pittsburgh 30, Pa.

- ☐ Please send me your booklet "United States Steel presents T-1" which contains the full story of "T-1" steel.
- ☐ Have your representative get in touch with me.

Name

Address

City State

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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS **"T-1"** CONSTRUCTIONAL ALLOY STEEL

SEE THE UNITED STATES STEEL HOUR. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.



UNITED STATES STEEL

CHASE[®]



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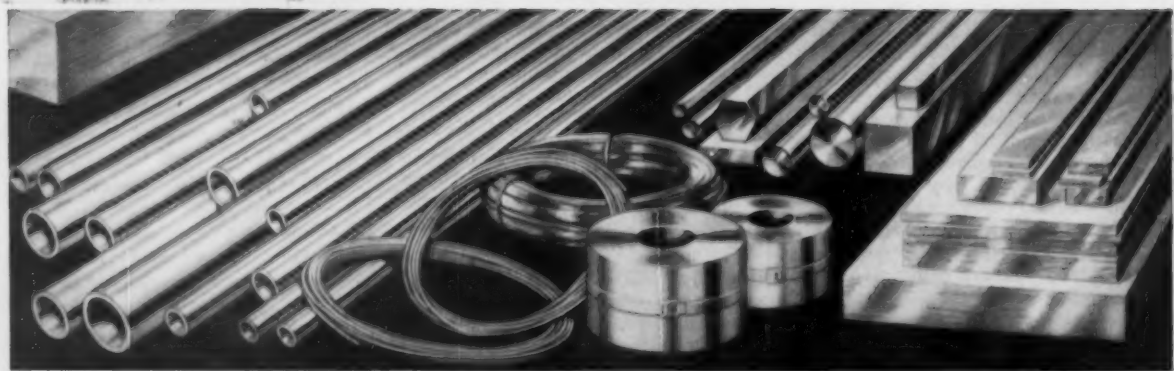


PLACE



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Saves Time... Cuts Costs

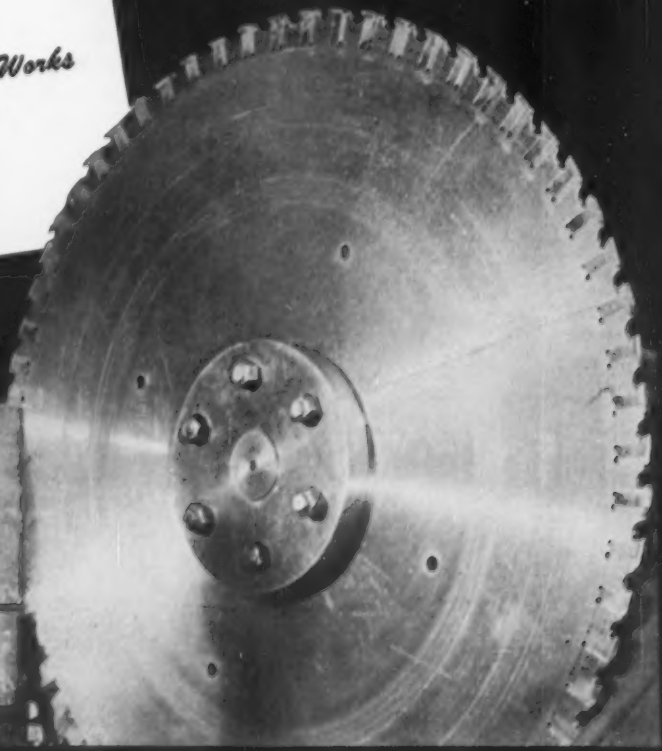
Rotary Planer . . . do milling jobs in one-third to one-seventh of time on an Espen-Lucas Rotary Planer.

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The **ESPEN-LUCAS** *Machine Works*
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• HEAVY TYPES OF SPECIAL MACHINERY

ESPEN-LUCAS
PHILADELPHIA





Production of battery manufacturer up 100% since switch to Enamelstrip Coil

and metal inventory is cut in half

Bright Star Industries of Clifton, N.J., found the answer to increased production, lower manufacturing costs, and greater product sales appeal in Enamelstrip Pre-Coated Coil.

It upped production better than 100% by eliminating slitting of sheet stock, stacking of strips, and hand feeding. It lowered inventory of metal by buying Enamelstrip Coil with different colors on either side—and thus permitted use of the same coil for different colored battery tops. It improved product sales appeal by using Enamelstrip Coil to guarantee the

uniformity of finish. It decreased scrap loss, because Enamelstrip Coils can be supplied to the exact width required, and scrap loss is negligible on long coils.

And since its experience with Enamelstrip in the making of battery tops proved so satisfactory, Bright Star has turned to this pre-coated coil for fabrication of other products. Costs are down and quality up on these products too.

Let Enamelstrip work for you in making substantial savings in costs. It is available in widths from 7/32 in. through 30 in., and in thicknesses from .006 to .035 in. in any base metal that will take a coating, and in



Some of the other products being made from Enamelstrip today include: Tags, Toys, Screw Caps, Containers, Buckles, Appliance Accessories, Lighting Fixture Parts, Picture Frames, Envelope Clasps, Flashlight Batteries, Ash Trays, Movie Reels, Venetian Blinds, Electric Stoves, etc.

a wide variety of finishes and colors. Write or call us for complete details.

THE COATED COIL CORPORATION

511 West 30th Street, New York 1, N.Y. • LOngacre 5-3161

National Sales Representatives for Enamelstrip Corp., Allentown, Pa.



Southwest's TALLEST Building by AMERICAN BRIDGE

Republic National Bank
Building, Dallas, Texas

Architects: Harrison & Abramovitz; Gill & Harrell

Structural Engineers: Edwards & Horth

Structural Steel Fabrication and
Erection: American Bridge



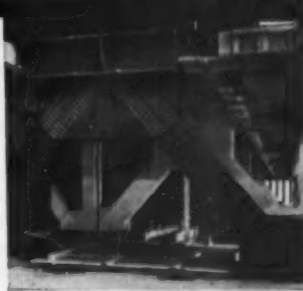
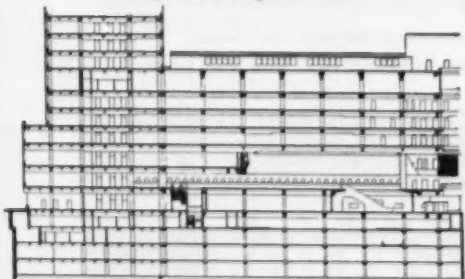
DEEP IN THE HEART OF TEXAS, looming high and handsome above an imposing skyline, the new 36-story home of the Republic National Bank of Dallas is the Southwest's tallest building.

Covering more than an acre of land in the center of the thriving metropolis, this \$25,000,000 building stands as another everlasting example of the strength and versatility of steel construction. 14,000 tons of structural steel went into its gigantic riveted frame—all of which was fabricated and erected by AMERICAN BRIDGE.

One of the interesting applications of the steel frame construction is the use of huge trusses in the bank wing's top story from which the floors above the main banking room are suspended, thus freeing the expansive, two-story main banking room of interior columns.

Your architect or consulting engineer can be relied upon to specify the type of construction best suited to your project. And AMERICAN BRIDGE has the experience, the equipment and technically skilled personnel to handle all types of steel construction with economy and dispatch — any time, anywhere. Our nearest office welcomes an opportunity to figure on your next job.

Right: Trusses on top floor of banking wing from which floors below are hung to free main banking room of columns. Below: cross section of banking wing showing 4-level underground parking floors and 2-story main banking room above ground floor.



AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: 525 WILLIAM PENN PLACE, PITTSBURGH, PA.

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AMERICAN BRIDGE



UNITED STATES STEEL

**you can
SAVE TIME
and
MONEY
on
jobs like this
with
the**



...GISHOLT SPEED SELECTOR!

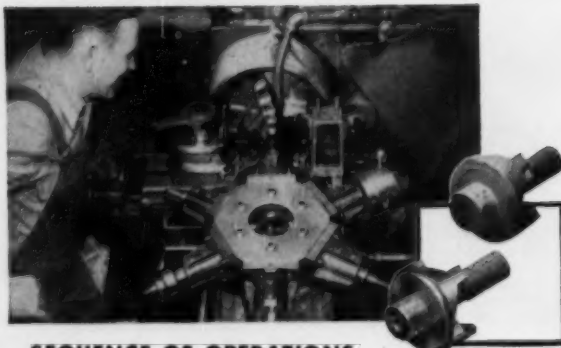
HERE'S WHY:

No manual gear shifting! You simply turn this hand wheel or touch a trip lever (for Direct or Pre-set operation). Shifting is automatic—by hydraulic power—while the operator positions the new tools for the next cut.

It's all so much simpler with the Speed Selector. There's no need for time-wasting computations, no mental effort, no physical effort. With simple controls, either direct or prearranged, the operator gets the ideal f.p.m. cutting speed for each cut. And it's *much faster*, of course!

The Speed Selector is standard on Gisholt Nos. 4 and 5 Ram Type Turret Lathes and on all Gisholt Saddle Type Lathes.

HERE'S HOW:



SEQUENCE OF OPERATIONS:

Note the star which indicates each time the Speed Selector is used.

- ★ 1. Hexagon turret—Center drill at 297 r.p.m. hand feed
- 2. Hexagon turret—Support with live center
- ★ 3. Square turret—Rough turn and face at 96 r.p.m., .003 feed
- ★ 4. Square turret—Finish turn, face and chamfer at 126 r.p.m. .002 feed
- ★ 5. Hexagon turret—Start and drill through at 226 r.p.m., .003 feed. Trip the Hi-Lo lever, eliminating even the need for turning the hand wheel
- ★ 6. Hexagon turret—Thread with tap at 39 r.p.m., leaders and followers

—and you're ready for a new workpiece

GISHOLT

MACHINE COMPANY

Madison 10, Wisconsin



THE GISHOLT ROUND TABLE
represents the collective experience of
specialists in the machining, surface-finishing
and balancing of round and partly round
parts. Your problems are welcomed here.

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✓ **happy balance between**
dependable performance and moderate cost



ROLLWAY
STEEL CAGE
 ROLLER BEARINGS

Tru-Rol precision, steel-cage, heavy-duty bearing with contoured guide lips assuring true right-line rolling, maintained roller alignment and thin oil film.

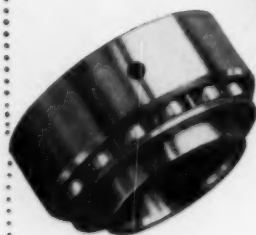
● Rollway's **TRU-ROL** Steel-Cage Bearings afford wide latitude in balancing *dependable performance, long life, and high load capacity* against *moderate cost*. They rate high in any comparison on a cost-performance basis.

A choice of stamped steel retainers with contoured guide lips, or steel segmented retainers assure true rolling and an evenly distributed *thin oil film* — *big factors in reducing power losses and heating*.

"Crowned" Rollers Relieve End Stress

TRU-ROL offers the extra advantage of a finish-ground "crown" radius on the roller ends. That relieves high end-stress and insures uniform load distribution over the entire length of the roller. The result: **TRU-ROL** Steel Cage Bearings carry heavier loads over longer periods without excessive end-fatigue. They are less affected by slight misalignment or shaft deflection.

Investigate **TRU-ROL** Steel Cage Roller Bearings before selecting any bearing in the medium price range.



TYPE D

Rollway Metric Series Steel Cage Roller Bearings

● Rollway Metric Series Steel-Cage Bearings offer the greater load capacity of solid cylindrical rollers, plus the true right-line rolling of trunnion rollers turning in a rigid steel cage. There's no roller skew, no pinch out, no cam action. Design permits maximum bearing capacity . . . within small space . . . at moderate cost.



**FREE
CATALOG**



**ROLLWAY
BEARINGS**

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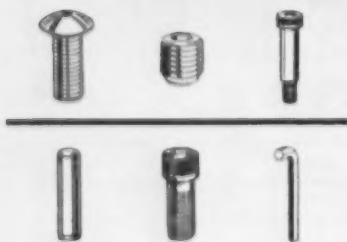
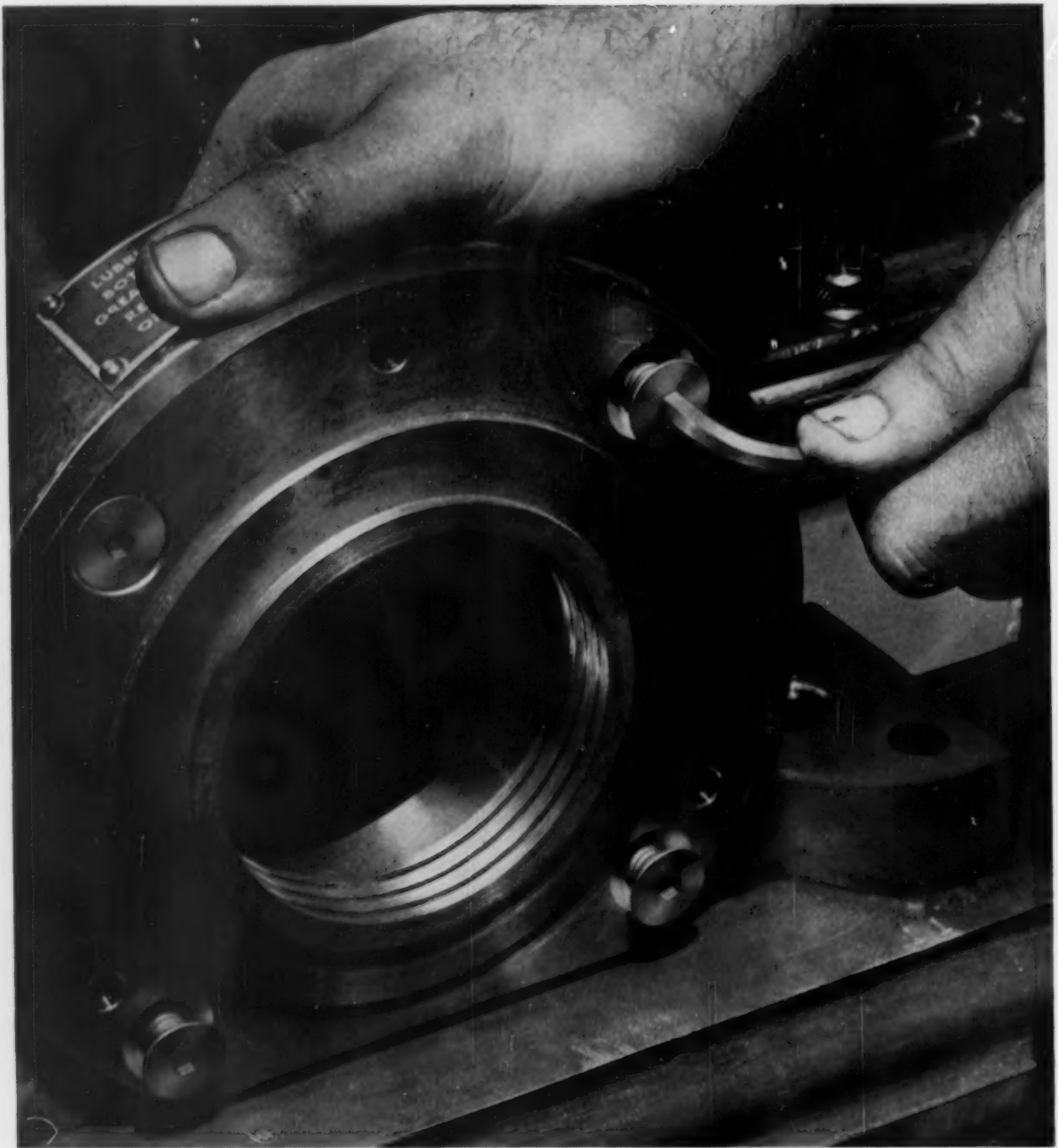
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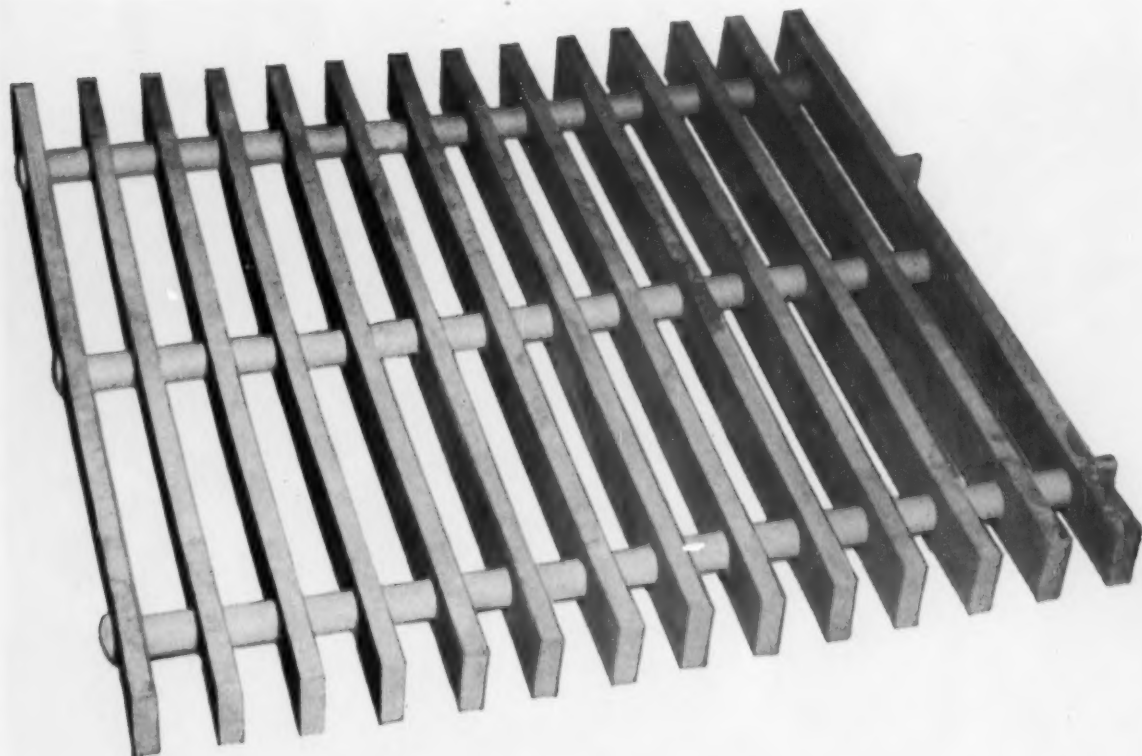
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This tray made of HASTELLOY alloy X has been heated to 2300 deg. F on more than 100 different occasions and still shows no signs of oxidation or distortion. In each cycle the tray is heated to 1300 deg. F for an hour, and then to 2300 deg. F for an additional half hour. Trays made from other materials, and used under the same conditions, failed from oxidation and warpage after a few firing cycles.

The tray is 18 in. square and is fabricated from HASTELLOY alloy X sheared plate. It is used to sup-

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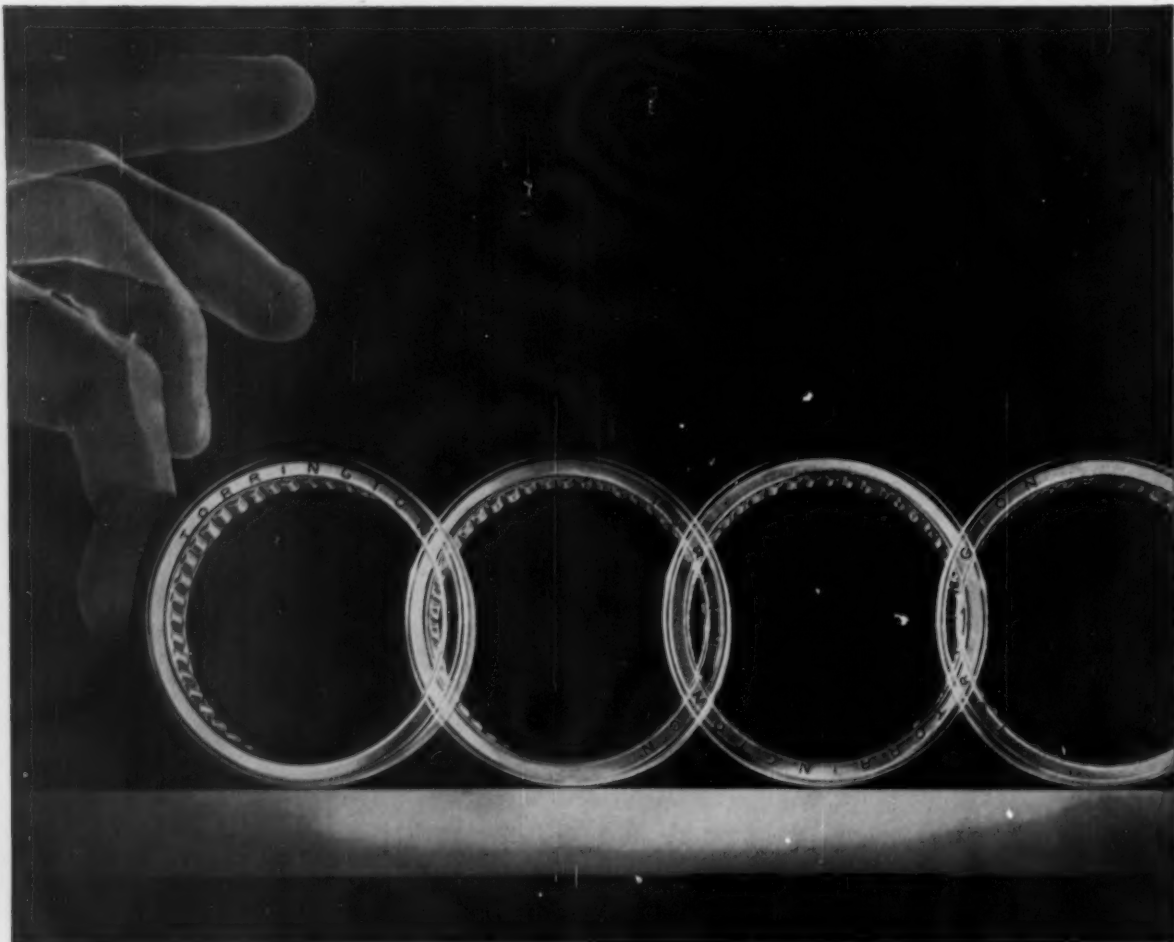


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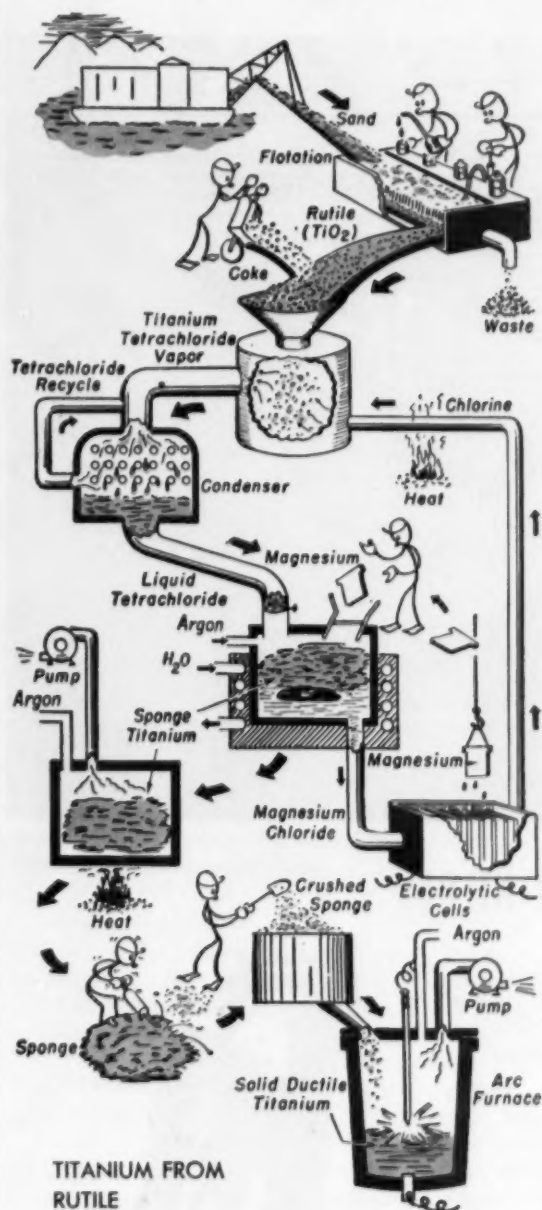
OPERATION: TITANIUM

how **LINDE Argon** helps perform a *Metallurgical Miracle*

The production of titanium, today's lightweight, high-strength, rustless "wonder-metal," involves a difficult and complicated reduction and melting process. Because hot titanium is so chemically active, combining with oxygen or nitrogen from the air with ruinous rapidity, it must be shielded at all times with a blanket of argon gas. The purity of this inert gas is extremely critical for only a few parts *per million* of chemically active gases severely affect the quality of the metal. LINDE is meeting these rigid requirements by supplying the titanium industry with large quantities of the highest purity argon, guaranteed at least 99.99% pure, to assure the greatest protection against contamination during production.

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This diagram represents the production of ductile titanium from rutile ore. High-purity argon is used to protect the titanium sponge from contamination during its production and while it is being melted in the electric arc furnace.

Courtesy Westinghouse Electric Corporation

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

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BIG R&M CRANE MOVES STEEL FOR KILROY

R & M built this big 15-ton crane to lift and move structural steel—never a dainty, packaged commodity—with two-handed flexibility. Two 7½-ton R & M Type "F" Hoists, independently controlled from the cab of this double-girder, five-motor crane, eliminate dangerous load-balancing.

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Pictured at right—45-foot span, 20-ton capacity R & M crane with 5-ton auxiliary hoist. Standardized cranes in single or double I-beam types available quickly in 20 to 65-foot spans; capacities to 10 tons.

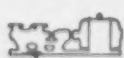


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The Iron Age Newsfront

Automatic Gaging: Change In Direction

One gage maker believes machine tools may eventually be designed around gaging functions. Reason: Automatic gaging's original role as an aid to the too busy machine tool operator or parts inspector is becoming less important. Modern applications give these instruments a more vital role in production through wider control of the machine itself.

Producers Eye Ductwork Market

Sheet aluminum producers are studying expansion and contraction noise problems in preparation for a full scale invasion of the central air conditioning ductwork market. Improved methods of hanging ductwork could reduce noise problems, studies show.

Pare Business Census Funds

Business is resting its hope on the Senate for full funds to publish results of the censuses of business, manufacturing and mining industries. The House has okayed a \$4 million appropriation, \$655,000 less than the Census Bureau says it needed to finish the project.

Blast Deflashing Cuts Finishing Costs

Costs of deflashing and deburring of both zinc and aluminum diecastings have been sharply reduced at one plant through use of airless abrasive blasting. Surface appearance and uniformity are improved while porosity and surface defects can be detected earlier.

Trademark Stamp Costs Cut

Ultrasonic impact grinding has made possible production of carbide trademark stamps that not only outlast but are less expensive than conventional hardened tool steel stamps. Beyond initial saving for stamp, are savings through elimination of downtime for stamp changes.

Two Trends in Transfer Machines

Trend in transfer and other type automatic machinery is more and more to (1) use standard machines wherever possible and (2) design equipment so a machine that is down stops only that section of the line.

Measures Linear Feed Rates Faster

One Midwest plant has built its own battery-powered, portable instrument to get a quick, accurate answer on machine tool linear feed rates. A millimeter reads "push" or "pull" traverse rate of a machine slide directly in inches per minute.

Builds Train of Tomorrow

General Motors is reported building a "train of tomorrow," presumably the light weight, low center of gravity, high speed variety. It will probably be introduced early in 1956 on one of the big eastern roads on an experimental basis.

Solves Machinability Problems Quickly

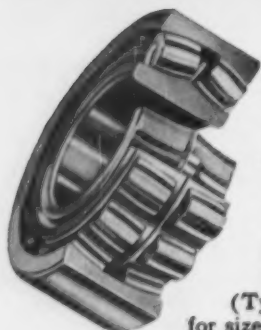
An electronic machinability computer recently developed will solve in two minutes machinability problems which normally take an engineer several hours to compute. The low cost machine can consider any of 13 operational variables which affect machinability and come up with the right answer.

Cold Work Methods Show Gain

The idea that it may be more economical to displace metal than to remove metal is gaining ground. One automaker is making several parts by cold extrusion as well as rolling splines on axles. Another is using cold extrusion to a limited extent. Substantial savings in material costs are reported by one firm for a small screw machine part now being produced by cold extrusion.

Bearings the wise man buys

To buy **SKF** Bearings is to obtain an important "extra"—the assistance of the industry's most experienced sales engineering staff—unbiased assistance because **SKF** makes an exceptionally broad line of ball and roller bearings.



SKF EXCLUSIVE

For heavy duty service the wise man buys this improved (Type "C") Spherical Roller Bearing. Only **SKF** makes it. Small for size, it provides up to 50% more capacity than other spherical roller bearings—vastly longer life for given radial and thrust load conditions.

SKF THRUST LOAD CARRIER

SKF's Spherical Roller Thrust Bearing is the wise buyer's answer where the problem is to support heavy thrust loads or combined loads which are predominantly thrust, on vertical or horizontal shafts. The only roller thrust bearing that is inherently self-aligning.

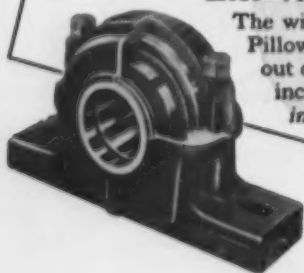


SKF STEELWORKER



For roll necks (and many other applications, too) the wise buyer chooses **SKF** Multi-Row Cylindrical Roller Bearings, a design which provides the utmost in radial rigidity. In the larger sizes, **SKF**'s hydraulic system makes mounting and dismounting easy.

SKF PROVED AND IMPROVED



The wise buyer has long specified the proven **SKF** Triple-Seal "SAF" Pillow Block. The "SAF" is easy to install and inspect; effectively seals out dirt while retaining lubricant; bearing self-aligns. Now, to provide increased life and capacity, **SKF** makes the "SAF" available with the improved (Type "C") Spherical Roller Bearing. As a further improvement, the "SAF" can now be obtained with either cast iron or steel housing.

7822

Request **SKF** Catalog 390 for complete data on all **SKF** Bearings.

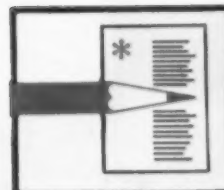


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BALL AND ROLLER BEARINGS



Warehouses Join the Steel Scramble

Steel warehouse business shows marked pickup . . . See inventory pinch developing by late June . . . Coil is tightest item right now with plates also getting scarcer . . . Complain about mill cuts—By K. W. Bennett.

♦ "WE UPPED our bar inventory strongly in March. At the time we thought maybe we'd overdone it. Right now, I wish I'd put in more. If warehouse business holds at its present pace, we'll be in trouble at least by July and probably June. And it's certainly holding its present pace."

This is the view of a purchasing agent for a midwestern steel warehouse. His coil stocks were already low, his cut sheet supplies sinking, and concrete floor was showing where his plate inventory had been stored. His customers were pushing for more steel.

40 Pct Gains

Warehouse business has been so good this year that it's promoting real worry about whether inventories are high enough to meet demand.

For an industry that had fallen off as much as 50 pct during 1954 from sales levels established the previous year, the warehouse

comeback has been terrific. Individual sales gains for a few firms have amounted to as much as 40 pct.

Warehouse business showed signs of picking up last September, following slight advances in late first half that were largely nullified by the sharp summer vacation slackoff in metalworking industries. By October of last year, warehousemen who had scheduled inventory reductions through December were putting on the brakes, stepping up their purchases of steel, particularly flat-rolled products, and adjusting steel intake up-

ward to meet the rising customer demand.

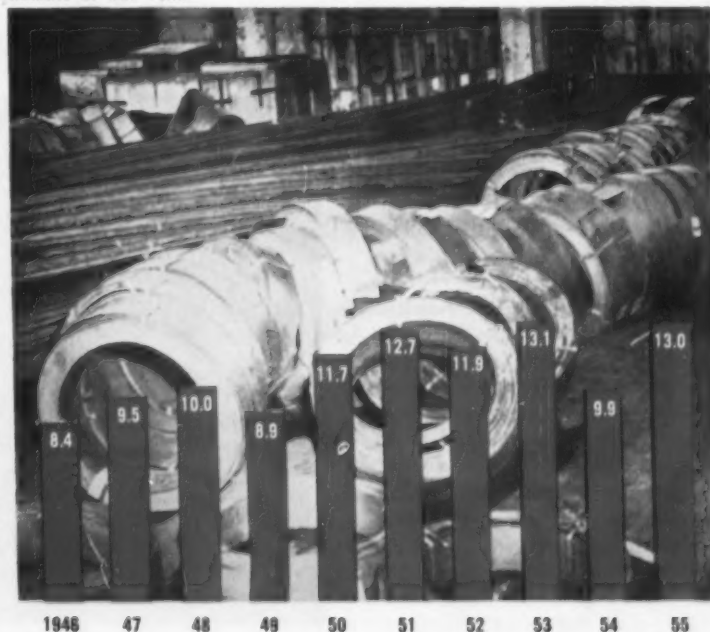
Sales showed real strength in January, slumped for some distributors in February and tore the lid off in March.

For example, one supplier doubled his plate sales and another scored almost a 50 pct gain over the previous month. At least part of the March gain came as mill customers developed spot shortages in coil, sheet, strip, plate, and bars.

Last week, the tightest item was coil. Mill carryovers running 35-45 days put increased pressure on al-

Shipments of Steel to Warehouses

Millions of Net Tons



*Other than oil and gas.

What Warehouses Took in '54

	Net Tons
Plates	702,754
Bars	1,855,086
Wire Products	1,271,720
Tin & Tinplate	140,289
Hot-Rolled Sheet	647,613
Cold-Rolled Sheet	913,829
Galvanized	801,146
Hot-Rolled Strip	93,924
Cold-Rolled Strip	52,813



FROM WAREHOUSE to Air Force customer in just 3 hours. Rush delivery is made by U.S. Steel Supply Co.'s St. Louis warehouse. Priority treatment is given aircraft quality steel for use in combat planes.



WAREHOUSE OPERATOR sends sparks flying from cutting saw. He's trimming beam to customer spec.

ready sunken warehouse stocks. Cut sheet was reported to be in fair supply, and warehousemen in some areas of the East and even the Midwest say they can still supply coil on comparatively short notice and in fair quantity.

But focal point of the developing coil shortage is Chicago with smaller warehouses in other areas feeling the pinch as well. Plate is a tough item almost everywhere but stocks are better than coil.

What Warehousemen Say

Said one warehouseman, "I could boost sales by better than 50 pct if I could get my hands on enough coil to handle the orders. The same goes for light plate."

Shipments of mill steel to warehouses and distributors cracked through the million ton level in March, amounting to 136 pct of shipments in March one year ago. This was the heaviest monthly advance in shipments to warehouse this year.

January shipments were 108 pct of the year ago level, February climbed to 119.5 pct. Figures aren't yet available, but reports from warehousemen suggest that after March gains in the amount of incoming mill steel were reduced.

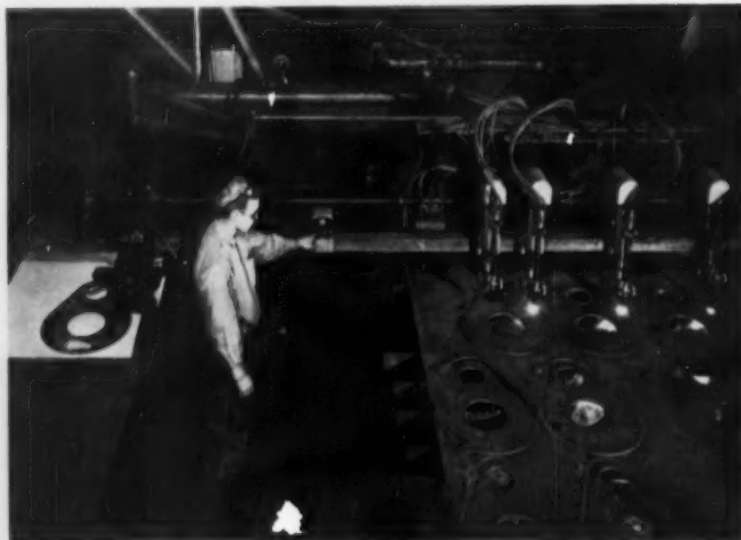
Tipoff on just how good business

really is for warehouses is the fact that increasing numbers of warehousemen are complaining that they are not getting enough steel from the mills. This is traditional in periods when the warehouse business picks up.

Also part of the regular pattern are the conservative estimates on how much warehouse business has picked up. A lot of warehousemen say sales are only up an average of 10 pct from last year. But a few

admit business is just about as good as it was in banner year '53—which would indicate the sales improvement might be as much as 40 to 50 pct.

Solid business being done by the warehouses is an important indicator that steel consumers are not buying their way into another 1954-type inventory surplus, as some fear. If there is any inventory building, it's in finished goods, not raw steel.



SMOOTHNESS AND UNIFORMITY are assured by use of motorized torches added to shape-cutting machine at Chicago warehouse of U.S. Steel Supply.

WAREHOUSES: Profit Margins Too Low

At ASW meeting in Boston, industry spokesmen report that profit margins are down too far . . . Prices are slated for a second look . . . Cite strides made by industry in recent years . . . Doxsey retires.

♦ **GROWING ROLE** of the warehouse in steel distribution was highlighted at the annual meeting of the American Steel Warehouse Assn. (ASW) last week in Boston. J. V. Honeycutt, Bethlehem Steel's sales vice-president emphasized this when he pointed out that in 1934, the year the association was incorporated, warehouses handled only 11 pct of total steel shipments; whereas last year their share was 19 pct. And, of course, tonnages involved have risen tremendously.

C. L. Hardy, president, Joseph T. Ryerson & Son, declared that steel distributors have been enjoying a "profitless prosperity." And he backed up his statement with facts that suggest that warehouse prices may be given a second look following the expected steel mill price increases this summer.

Mr. Hardy reported on a survey showing that of 219 companies replying some 38 either made no money at all or actually lost money last year. And only 11 pct of the 219 had a return on their sales

dollar of 6 pct or more. He, like others at the meeting, suggested that better accounting practices would reveal real operating costs.

Improve Merchandizing

Another factor highlighting the importance of the warehouse was a study showing how distributors tend to level out valleys in steel production. A study was presented which showed that high peaks in mill steel shipments to warehouses occurred in 1927, 1932, 1938, 1946 and 1952. These were all years of declining mill production, as were 1930, 1931, 1949, and 1954, when shipments to warehouses also increased somewhat. Some of the dips in steel output during these years were caused by strikes, others by depression or recession. Yet warehouses cut their buying less in these years than did other steel consumers.

Ideas for more aggressive merchandizing were described to some 500 ASW members by two New Jersey warehousemen, Jack Berry, Kenilworth Steel Co., and Ralph W. Shaw, A. R. Purdy Co. The former described the "Kenilworth Clinic" which he developed to present customers with new ideas in flame cutting, roll-forming, ultrasonic cleaning, packaging, etc., just as they would see them at a big national exposition.

He hauls dining cars into the plant, sets up tents outside, exposes thousands to new ideas. Now, he says, the problem is that more companies want to exhibit at the Clinic than he can accommodate. He plans to put up more tents next year.

What Warehouses Will Stress

Mr. Shaw listed a dozen ways—ranging from promotion of his firm's wall inventory in the order room through teaser posters and



NEW ASW Executive Secretary, Robert G. Welch. He replaces Walter S. Doxsey as chief staff officer of the warehousemen's association.

traveling trailer exhibits—to boost sales. He's borrowed merchandizing techniques from other fields—techniques not often found in steel distribution.

What's ahead? It's a safe bet that members will put more emphasis on the factors that have so changed their industry during the past 20 years—on "Cost of Possession." These include the savings in time, space, inventories and capital equipment which warehousemen offer the user.

The association, during its 46th annual meeting paid special tribute to its retiring president, Walter S. Doxsey, who has been its chief staff officer since 1934 and its president since 1941. Robert G. Welch replaces Mr. Doxsey as chief staff officer of the association.

New Warehouse Officers

♦ **Paul O. Grammer, Grammer Dempsey and Hudson, Newark, N. J.,** was elected president of the American Steel Warehouse Assn. for the coming year. Other officers elected at the Boston meeting last week are **Lester B. Lion, Peter A. Frasse & Co., Inc., New York,** and **M. R. Lowenstine, Jr., Central Steel & Wire Co., Chicago,** vice presidents and **C. L. Hardy, Joseph T. Ryerson & Son, Inc., Chicago,** treasurer.

STEEL: Fairless Gets A New Job

Election will strengthen industry's public relations . . . Eighth Institute president will serve without pay . . . Industry leaders in optimistic frame of mind . . . Wages, prices, prosperity aired—By J. B. Delaney.

♦ STEEL industry public relations got a shot in the arm with election of Benjamin F. Fairless as president of American Iron and Steel Institute.

The industry already is doing a creditable public relations job, but there's still a lot to be done. Mr. Fairless, long one of steel's best salesmen, will provide the extra zip needed to plug the weak spots and further strengthen the strong points.

Mr. Fairless' election provided a welcome highlight to the Institute's 63rd general meeting in New York, where talk centered on how long the current steel boom will last, the need for further industry expansion, labor relations, and technical progress. There wasn't a pessimist in the crowd of over 1200 members.

The former chairman of U. S. Steel Corp. is the eighth Institute president since 1908, when the late Judge Elbert H. Gary got the job. He succeeds Walter S. Tower, who retired in 1952. Mr. Fairless will serve without pay. He will con-

tinue with U. S. Steel as a director, member of the finance committee, and chairman of the executive advisory committee.

Mr. Fairless is a good man for a tough job. He's on first-name terms with leaders of industry, government, and labor. His relations with David J. McDonald, president of the United Steel Workers, has blossomed into a "Ben" and "Dave" friendship. He also got along well with the late Philip Murray, the union's first president, despite periodic strife.

Gary Award

Three veteran steel men, all active in the industry for over a half century, were awarded Gary Memorial Medals at the concluding dinner meeting. They were Tom M. Girdler, Chairman, Republic Steel Corp.; E. T. Weir, Chairman, National Steel Corp., and Charles R. Hook, Chairman, Armco Steel Corp.

The awards were for outstanding achievement and service in the industry. Mr. Girdler's was for

engineering, organizing, and executive ability; Mr. Weir's for guiding and developing a small steel operation into one of the nation's largest, and Mr. Hook's for leadership in human and industrial relations.

No Strike Seen

Industry leaders showed no concern over upcoming steel labor negotiations. They admitted privately that the steel workers will get a wage increase, but let speculation on the amount to others. Early forecasts of a 10¢ pay boost may turn out to be conservative.

Industry executives made no secret of their intention to increase prices to offset higher wage and material costs. The increase will follow the labor settlement. It may average \$4 to \$5 per ton depending on amount of the wage boost.

The Institute Medal was awarded to Arthur P. Woods, Jr., a research engineer with Armco Steel Corp., for his paper, "Some Statistical Methods Used in Studies of Steel Plant Operations," presented at last year's general meeting. The award is made annually for a paper of special merit and importance, read before an Institute meeting.

Pure Research Need Cited

In the annual Charles M. Schwab Memorial Lecture, Dr. Lee A. DuBridge, president of California Institute of Technology, and chairman of the Science Advisory Committee of the Office of Defense Mobilization, pleaded for increased support by American industry of the basic sciences.

Dr. DuBridge said that while the world's scientific center has shifted to the U. S. as a result of World War II, there is evidence



NEW TEAM at the head of AISI will be Benjamin F. Fairless as president and Max D. Howell, continuing as executive vice-president.



INSTITUTE medal is received from Mr. Howell by A. P. Woods, of Armco Steel Corp., left.

of a scientific boom in Russia and America's lead is a precarious one.

"We are a practical people who want quick results," he said. "We are impatient with long-deferred dividends. . . . We don't like 'egg-heads.' We prefer action, efficiency, results and no nonsense."

Max D. Howell, executive vice president of the Institute, predicted a bright future for the industry based on new applications and markets, plus increasing population of the country. If industry production continues at its present pace through the last half of 1955, a new annual record of 114 million tons will result, he said. He added that the industry is faced with the possibility of further substantial expansion in the near future.

A survey by Opinion Research Corp. put the finger on some of the PR problems confronting the industry and its new president.

The survey turned up some good—and bad—points about industry public relations. The assets are public recognition of the industry's importance, its good wages, and its progressiveness. But there's still a job to do in selling steel's good safety record, its labor relations, and in getting across important information on specific subjects.

In compiling its report, Opinion Research interviewed over 3500 people, including steel workers, community leaders, clergymen, teachers, and state and local officials. It was the third such survey since 1943.

Bright Future Predicted

Other developments at the two-day meeting:

If the proposed merger of Bethlehem Steel Corp. and Youngstown Sheet & Tube goes through, the merged company will expand annual capacity by 3 million tons. Eugene Grace, chairman of Bethlehem, and J. L. Mauthe, president of Youngstown, said 2 million tons would be installed in Chicago and 1 million in Youngstown. This would raise combined capacity of the two companies to 28.5 million tons. Although the Justice Department has indicated its opposition to the merger, company officials are going ahead with their plans.

Mr. Homer, Bethlehem president, tied in potential buildup of steel with the nation's growth:

"It is estimated," he said, "that the total national production of goods and services may be expected to grow from the current level of some \$370 billion to an annual average Gross National Product of perhaps \$570 billion in 15 years.

"We know that the growth in the demand for steel in the past has

closely paralleled the growth of the Gross National Product," he pointed out. "Therefore, if the projections for the economy as a whole are realized, the steel industry will need an ingot capacity of about 185 million tons in 15 years to handle peak requirements."

On the guaranteed annual wage, the president of the second largest steel company conceded that everyone would like to have constant employment, but such a condition is the "end product of a combination of factors, most important of which is the customer."

He said that unemployment problems cannot be solved through "the so-called guaranteed annual wage." He said there already exists "an effective government-sponsored unemployment compensation system.

Mr. Homer also talked about progress in labor relations in the steel industry:

"With respect to labor matters, we can also point to progress. There has been a heartening improvement in the relationships between steel companies and the labor officials representing so many of their employees. It has been gratifying that union officials have shown an awareness of the importance of complying with agreements—not only with regard to slowdowns and wildcat strikes, but also in other aspects of the contractual relationship."

Congratulations!

Members of the board of directors of the American Iron and Steel Institute, meeting last week in New York, unanimously adopted a resolution congratulating THE IRON AGE on "its one hundred years of constructive service and outstanding accomplishments."

Members of the board were unanimous in "expressing their confidence that THE IRON AGE would in the future live up to and exceed the fine record it established during the past century."

METALLURGY: Weapon Against Crime

FBI uses tools of the metallurgist to track down criminals . . .

Well-equipped lab helps law-enforcement agency build up its cases . . . Case of the stolen lead pigs solved . . . Plane sabotage disproved.

♦ **METALLURGY** is doing a modern-day sleuthing job for the Federal Bureau of Investigation.

In his annual report to Congress, FBI Director J. Edgar Hoover noted that in fiscal 1954 his organization's well-equipped laboratory had made 240 metallurgical examinations that aided in tracking down criminals or produced the answer to questions that would have stumped early-day police investigators.

The metallurgical section of the FBI laboratory includes X-ray equipment, hardness testers, microscopes, a research metallograph, an electric furnace, and a Magnaflux inspection unit.

With these tools, FBI technicians have cracked many a thorny case, including that of the eccentric who allegedly stole "by the almanac." In another instance, the FBI satisfied itself that a plane mishap in the South was due to metallurgical failure in a motor rocker arm and not to sabotage.



FBI LAB technician uses radiograph to inspect evidence in recent case. Machine will detect hidden flaws.

The case of the "almanac thief" concerned a crafty individual who took to stealing lead pigs on moonless nights, loading them in the false bottom of his pickup truck and later disposing of them to scrap metal dealers. He operated on dark nights to lessen chances of his being seen while taking the lead pigs from an outdoor stockpile.

After driving home with his loot, the thief removed all identification marks except the name of the producer. Then he had someone make him a cast-iron mold so that he could cast pigs that appeared to be identical with the stolen pigs. Although no evidence was uncovered that he had sold any of the pigs he had recast in his newly made mold, small lots of more than 100 tons went to various scrap dealers.

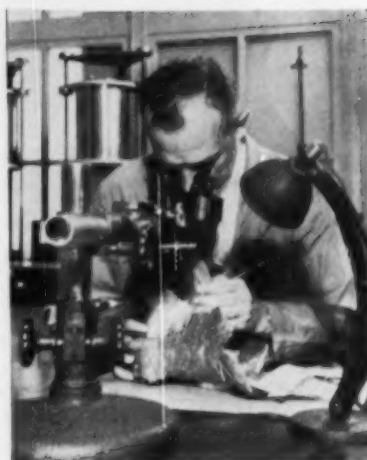
Through a chemical analysis, FBI metallurgists established that pigs found buried in the suspect's yard, some of those he had sold to scrap dealers and some of those remaining in the stockpile were identical in composition. Dirt and paint traces further tied buried pigs to stockpile.

The suspect was convicted.

Sabotage Disproved

In its investigation of the plane accident, the FBI found that failure of a recently overhauled motor was due to a broken rocker arm. Metallurgical examination proved that the cause of failure was fatigue initiated by a sharp v-shaped defect or notch on the outer surface of the rocker arm.

The FBI found that in course of manufacture the rocker arm was given a protective metal coating which covered the entire surface of the rocker arm including both sides of the notch responsible for



TORN METAL from a smashed railroad car journal box is placed under the microscope in search for evidence.

the fatigue fracture. Thus any theory of possible sabotage after the motor had been placed in the plane appeared to lack foundation.

The metallurgical unit of the FBI lab finds that its work usually is directed toward (1) Establishing identity of the manufacturer of a piece of evidence found at the scene of a crime or accident, or (2) determining the cause of metal failures.

Metallurgy is just one of the sciences brought into play by the FBI since Mr. Hoover established the laboratory in 1932. The use of metallurgy developed, just as did the other sciences, as the need for specialized examinations daily became more obvious.

As a result, any law enforcement agency in the country is free to obtain, without cost, through the FBI lab, even the most technical examination of evidence in a criminal case.

MOLYBDENUM: It's Bursting Its Seams

New markets in chemical industry, agriculture add to growing use as alloying material . . . New carburizing steel is out of laboratory . . . Jet engines bring out new molybdenum alloys—By R. D. Raddant.

♦ **MOLYBDENUM**, a metal that is still in its comparative youth in the metalworking industry, is bursting out of its original market with the rapid growth of a teenager.

Not only is it expanding its penetration of its major market as an alloying material for steels, but it's adding to its market as pure molybdenum, as an alloying base, and in nonmetallurgical uses.

Nearly 75 pct of all consumption of molybdenum is as an alloying material in the iron and steel industry. This percentage is probably not subject to radical change, despite inroads into other fields because of increased applications in basic iron and steel.

But at the same time, world consumption of molybdenum in chemicals, agriculture, molybdenum metal and special alloys increased from 2,664,000 lb in 1952 to an estimated 3,880,000 lb in 1955, and to a projected 8,890,000 lb in 1960.

Supply Adequate

Until 1918, commercial development of molybdenum was at a standstill because of high price and uncertain supply. The discovery and development of the mine at Climax, Colo., together with a temporary demand for the metal in World War I, gave the metal its first real start in industry.

Molybdenum production capacity is now double the average annual use by the Free World over the 5-year period before Korea. This improvement in supply is largely the result of an 80 pct expansion program completed in 1954 by the Climax Molybdenum Co. This mine, now the largest underground mine in North America, could supply all the Free World's need for at least 35 years and possibly many years thereafter.

During the past 15 years, the recovery of molybdenum as a by-product of several copper mines has been developed, augmenting this largest single source.

Its ability to confer properties of hardenability, hot hardness, strength at room or elevated temperatures, and corrosion resistance led to its extensive use as industry developed various molybdenum steels in the period after World War I, when it received its initial impetus.

Many New Uses

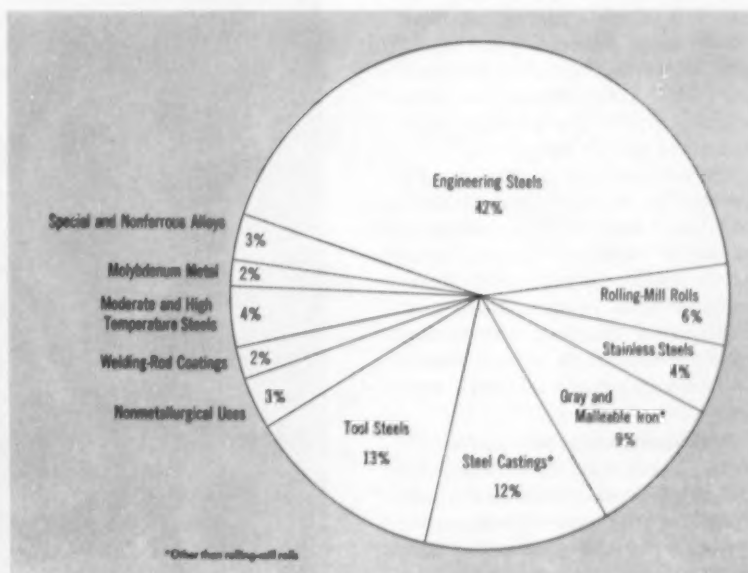
Molybdenum use as an alloying material has grown steadily in recent years. Shortage of nickel speeded its development in the field of engineering steels. Many authorities believe that in the long

term, molybdenum will continue to increase and nickel decrease in engineering steels.

In what other directions will the molybdenum market expand? In the development of new steels, particularly carburizing steels, molybdenum alloys, and pure molybdenum, special and nonferrous fields, in atomic energy, in the chemical industry, and as a trace element in agriculture.

A new product now emerging from the laboratory stage is a carburizing steel with 0.5 pct manganese and 0.5 pct molybdenum. The nickel shortage has been a particular problem in this direction as nickel-free alloys have not been too satisfactory. The new steel promises to be comparable in cost, possesses excellent machin-

Molybdenum Consumption in Industry



MOST molybdenum goes into iron and steel as alloys, but other markets are expanding.

ing and good carburizing properties.

The taconite industry opens up an entire new field for new molybdenum alloys in the large amount of wear resistant materials that will be needed for grinding balls, ball mills and the like.

Molybdenum parts are used in television. Molybdenum hooks hold up filaments in electric light lamps. The best electrode in glass melting is molybdenum. It is now being tried as the piercing point for tube mills.

Titanium Alloy

A molybdenum base alloy for turbine buckets for jet engines is now in the laboratory stage. The arc-melted material is forgeable but offers multiple problems of how to weld and fabricate it, and how to make an oxidation-resistant coating. These problems now appear to be on the way to solution.

Four alloys have been tried: 2 pct tungsten, 1 pct vanadium, 0.5 pct titanium, and 0.25 pct columbium, with the titanium alloy the most promising.

In the field of nuclear power, molybdenum has sizable potential. Use of molten metals for transfer of heat in the nuclear power developments opens up a field where its corrosion resistant and high temperature resistant properties give it a growing market in the atomic age.

Fastest growing of the special markets is in the chemical field. To date, molybdenum's biggest market in chemicals is as a catalyst in petroleum reforming. Fastest growing is in agriculture as a fertilizer. A third market in the chemical field is in colors, where molybdenum orange has been well known for years.

Molybdenum disulfide is the essential component of a new family of lubricants developed since World War II. Over 30 companies now manufacture greases, oil dispersions, resin-bonded films, or dry-powder lubricants based on the material. Total consumption of molybdenum is not great, but rate of increase is substantial.

COAL: It's Making a Comeback

Decline is over . . . Industry, steel and power will take 800 million tons by 1975 . . . UMW will be after cut of new prosperity . . . Exports up—By W. G. Brookfield.

◆ **SOFT** coal industry is on its way back. The rapid decline in production since the peak year of 1947 has been halted, and future prospects for the industry are bright.

Since 1947, production had fallen from a record 631 million tons to 392 million tons last year. This year's production is already 16½ pct above the same period last year, with a weekly record of 8,925,000 tons produced the week ending May 14th. Even though a good part of this increase repre-

sents inventory adjustments, most industry spokesmen feel that 1955 totals will be at least 10 pct above 1954.

The immediate future of bituminous coal should show continued, low rate gains for several years. Then, production should accelerate to a faster and greater pace.

Douglas McKay, Secretary of Interior, says many experts foresee by 1975, the use of 300 million tons of coal for power, another 150 million tons for coke for the

Bituminous Coal Production



steel industry, and increased amounts for home and industrial use. If the experts are correct, total coal requirements in 1975 will be 815 million tons.

Wage Issue

Coal exports for the year ending in September may total 24 million tons, 10 million more than for the previous 12 months, according to a forecast by the Foreign Operations Administration.

These facts have not gone unnoticed by John L. Lewis and his United Mine Workers. In a recent speech, Harry M. Moses, who heads up the Bituminous Coal Operators' Assn., said the UMW will soon be asking for its piece of the new coal profits. Mr. Lewis will probably wait until after the auto and steel negotiations before going after a new contract for the mine workers. He may reopen the contract on 60 days notice. The last increase for the miners was negotiated in 1952.

It is generally believed that the growing cooperation between the UMW and the coal operators, chiefly through the efforts of Messrs. Lewis and Moses, will result in a peaceful settlement.

The rapid erosion of soft coal markets since 1947 has flattened out. While there will still be slight long-range tonnage losses from the railroads, Canadian exports, home heating and general industry, these markets have already experienced the bulk of their depreciation.

Oil and Gas Drop

On the other hand, there are markets of the industry, principally steel and utilities, which are recording sufficient tonnage gains to more than offset the losses.

The availability of oil and gas has been the main cause in the decline of soft coal use, particularly, as residual and locomotive fuel. As an example, railroad consumption has dropped from a 100 to a 17 million ton market. While this entire market may eventually be lost, yearly loss increments are almost negligible today.

It is an accepted fact that gas and oil production will peak sometime within a year or two of 1960. That's when the soft coal industry

is expected to really start moving.

It is expected that by 1975 the nation's energy lot will have doubled over 1950 requirements. These new growth demands will have to be filled by coal once gas and oil production has peaked.

Also, at peak gas and oil production, increased amounts of crude oil will be steered away from second and third grade uses for processing into premium grade products. Additional crude will also be used for other purposes such as chemicals and plastics. As these new trends develop, more and larger markets will be inherited by the coal industry.

Manpower a Problem

There will also be increased use of soft coal as a supplemental source for synthetic fuels. It is already being considered for a gas supplement, but its use as a liquid fuel supplement is a long way off.

Accompanying this resurgence of the soft coal industry will be inevitable problems. Chief concern is that of manpower. During the plunge since 1947, there has been a tremendous loss of workers to other industries. Much of this loss is permanent. While increased efficiency and mechanization will help considerably, it may well be that if the industry booms as expected during the 60s, a manpower shortage could easily develop. This is particularly true with respect to research, engineer-



"Let's wait, Mugwa. It'll be bigger in the morning."

RAW MATERIALS

ing, and the supervisory personnel categories.

The effect of atomic power on the industry will come only in the distant future after many initial and more pertinent uses of atom power are satisfied. Even then, it is expected that the total energy load demanded by the nation will be so large as to sustain a strong demand for coal.

Make Mines Safer

Roof-fall accidents in mines may become fewer as a result of joint industry-government work on a new roof-bolt bearing plate.

Made of rubber sandwiched between layers of steel, the pad was designed by U. S. Bureau of Mines scientists and developed by the agency and the Goodyear Tire and Rubber Co. It consists of two 5-in.-diameter steel discs, 3/4-in. thick.

The roof bolt is inserted in the center of the compression pad and placed between the nut of a slotted-type bolt, or the head of an expansion-type bolt, and the mine roof.

Test Northwest Ores

Locally available Pacific Northwest ores may be used in an electric furnace to produce pig irons of any composition for foundry use, according to a new study by the U. S. Bureau of Mines.

The Bureau used locally available materials, including off-grade manganese-chromium-nickel-bearing materials, and chromite concentrates; scapose iron ore; hogged-wood waste, and Northwestern coals, limestone and silica to produce pig irons of varying compositions in a semi-commercial test with a 6000-lb charge.

The report says that the manganese-chromium-nickel-bearing materials are suitable for adding to smelter charges to produce pig iron, but most of them are unsuitable for smelting alone to produce ferro-alloys.

Details of the tests are given in "Special Pig Irons for the Pacific Northwest" (R.I. 5120).

How Instruments Help Make Steel

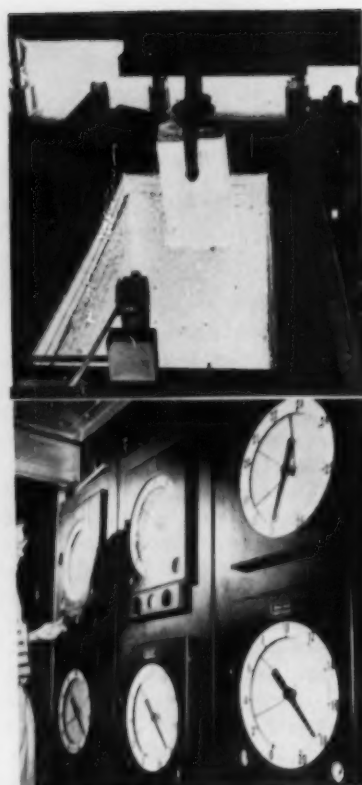
◆ SWEAT and strain have given way to precise, automatic controls in most steelmaking operations today. Good example of the industry's growing automation is offered by Lone Star Steel Co. in its modern integrated works at Lone Star, Tex.

At Lone Star, temperature indicators of Minneapolis-Honeywell Regulator Co. follow iron and steel through annealing, openhearth, soaking, normalizing and other operations calling for close heat regulation. Automatic controls respond to signals from detector units, working valves and dampers to

maintain critical temperatures and pressures.

Controls and indicators are located on compact panels, which can be removed from hot furnace blasts. Visual indicators allow operators to check performance of the system. Automatic recording devices maintain fuel consumption and production totals.

Fullest development of the automation theme comes in the pipe mills, which at Lone Star, give completely automatic control from skelp to finished pipe. Untouched by human hands is a slogan that applies to more and more steel.



1. INGOT leaves soaking pit of Lone Star Steel Co. after electronically controlled heating.

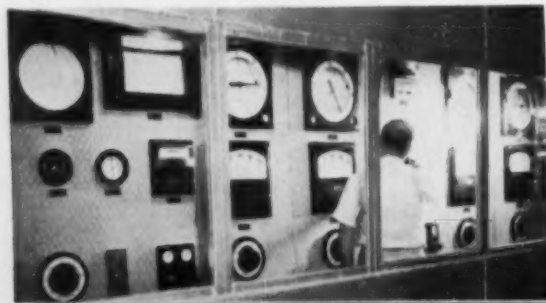
2. RECORDING and controlling instruments assure right fuel mixture and heat in roller furnace.



Above: BREAKDOWNS leaving roller hearth furnace get final temperature check from radiation-type detectors of Minneapolis-Honeywell Regulator Co.

Right Top: BRAIN CENTER for pipe normalizing furnace receives signals from detectors in seven furnace zones, controls fuel flow and temperature.

Right Bottom: CAST IRON pressure pipe rolls out of annealing furnace as battery of automatic controls regulates pressure and heat.



Contracts:

Aircraft companies dominate defense award list.

Dominant position of air power in the present military preparedness program is revealed again in the new Defense Dept. list of 100 major prime contractors who supply weapons and equipment to the armed forces.

First five companies named in the tabulation, covering the period July 1953 through December 1954, are all in the aircraft industry. These firms are United Aircraft Corp.; Douglas Aircraft Co., Inc.; North American Aviation, Inc.; Boeing Airplane Co.; and Lockheed Aircraft Corp.

Automakers Slip

Aggregate value of contracts awarded to the top five companies during the 18-month period was more than \$4.5 billion, or approximately 27 pct of all prime awards for U. S. work.

Of the next 10 firms listed, six are directly in the aircraft industry. Their prime contracts had a total dollar value of just over \$1.7 billion.

Automobile companies, including General Motors Corp., are relegated to secondary positions, the list shows, by cutbacks in land forces procurement after the end of the Korean War. First of the car manufacturers to appear on the new register is Ford Motor Co., in 33rd place.

General Motors, first among defense prime contractors in June 1953, subsequently recorded cutbacks which exceeded orders by \$58.9 million. Chrysler Corp. found its cutbacks topped orders by \$111 million. Biggest "minus" figure was listed by Westinghouse Electric Corp., with cutbacks \$255.9 million greater than awards.

In terms of present production, the Defense Dept. notes, many of the 45 companies are still among the biggest suppliers of military items. General Motors, for example, gives its military backlog a dollar value of more than \$1 billion.

DEFENSE



LAUNCHING of radar platform at Bethlehem Steel's Quincy, Mass., shipyard marked first step in construction of new offshore warning ring.

Warning:

Ready first radar platform for offshore ring.

A network of man-made islands 100 miles off the East Coast moved closer to operation with the recent launching of the first unit in Quincy, Mass. Islands are thought to be part of a defense warning system but no details have been released on their function.

Coming out of a Bethlehem Steel shipyard, the initial unit is a triangular platform, similar to offshore oil rigs, and will rest on legs extending down to the ocean floor. It will support radar equipment, provide helicopter landing space, afford crew housing.

Columns Support

Supporting legs are heavy columns filled with concrete and measuring about 150 ft in length by 10 ft in diameter. Ten pct monel clad steel is being used in column sections most exposed to corrosive action. Buffers around the structure sheathing will be pure monel.

Platform must be positioned by

Aug. 15, before the hurricane season, and is slated for early delivery. When all units have been placed, they will form a ring stretching from New York to Newfoundland.

Sign Shell Contracts

New artillery shell contracts have been awarded Wisconsin and Minnesota firms.

National Presto Industries, Eau Claire, Wis., has a new contract with Army Ordnance Corps for production of \$2.7 million worth of 8-in. howitzer shells.

First lot of the heavy shells, to be manufactured by the hot-cup-cold-draw method, is scheduled for delivery in November, 1956.

New Army contract with the Arlington Corp., St. Paul, calls for installation of a 75 mm artillery shell line and initial delivery of the first lot of shells next fall.

The St. Paul firm submitted the lowest of 56 bids to get the \$650,000 contract. It is the first Army shell contract awarded to the company.

Aluminum:

ODM reveals plans for plant to cost \$85 million.

Plans for a major aluminum producing plant have been revealed by the Office of Defense Mobilization. St. Joseph Lead Co. and Pittsburgh Consolidated Coal Co. have applied jointly to ODM for a certificate of necessity covering primary aluminum facilities to cost about \$85 million.

Approval Seen Likely

If granted, the certificate would permit the group to write off cost of the new plant in 5 years for tax purposes. Approval by ODM is seen likely since the agency is known to be concerned over reports of aluminum shortages and has been considering another round of expansion in the industry.

The sums named in the application indicate the plant would have a capacity of over 50,000 tons of aluminum ingots a year. Construction within a year's time is pointed to by the 6 month expiration provision of the tax certificate.

Plant Site Unknown

Site of the new plant has not been made known but connection of Pittsburgh Coal with the operation suggests that construction will be in a coal producing region.

Added production of proposed plant would help ease periodic aluminum shortages such as exist at present.

Company officials confirmed reports of a coal-powered Pennsylvania operation, but emphasized that plans were in a preliminary stage with actual construction hinging on satisfactory tax, finance and other conditions.

Add Coke Battery

United States Pipe & Foundry Co. plans further enlargement of its coking facilities at the North Birmingham Coke Plant.

New facilities will include 30 Koppers chemical-recovery coke ovens, additional coke screening facilities and additional oil scrubbing and oil refining equipment.

When the new battery is completed, the company will have a total of 180 ovens capable of coking approximately 3500 tons of coal per day.

Add to Wire Plants

The Electric Auto-Lite Co., Toledo, has completed plans for development of production facilities at its wire and cable plants at Port Huron, Mich., and Hazleton, Pa.

Total cost of the projects is estimated at \$1.2 million.

Largest undertaking will be at Port Huron, where 50,000 sq ft of manufacturing space will be added. New equipment will include magnet wire enameling ovens and wire drawing machines. Cost of the operation will be about \$1 million.

An estimated \$200,000 will be spent at the Hazleton plant to provide

facilities for handling wire volume for 12-volt electrical equipment.

The projects are expected to be completed and in operation by late fall.

Build Pipe Facility

Stainless Welded Products, Inc., Jersey City, N. J., is constructing new production facilities at Clifton, N. J. Operations at the 38,000 sq ft pipe and tube plant are slated to get underway in September.

Included as additional equipment needed for a new product, "Swepeco FF" Grade full finish pipe and tubing, are two 380 and 550-ton mechanical presses, expected to increase production by 50 pct.

Install Plant Furnace

John A. Roebling's Sons Corp., Trenton, N. J., has installed a new patenting furnace at the company's Roebling, N. J., works. The new facility is expected to step up production of wire and wire products.

Installed in the steel wire mill division's galvanizing shop, the furnace has already undergone successful test runs.

Installation entailed razing a 20 ft sq brick stack and replacing it with two steel stacks. Noxious fumes have been eliminated from the work area by exhaust fans extending over both the lead pan and acid tank.

Develop Test Facility

Solar Aircraft Co., San Diego, Cal., has begun construction on a \$100,000 research facility for testing gas turbine engines, slated for completion in July.

The installation will be built around an 1800 hp diesel engine weighing approximately 20 tons. Special foundations to carry the engine's weight plus that of other heavy equipment are now under construction.



"Fast enough?"



DRAWING KOVAR, a special alloy steel that's considered difficult to draw, is easy with this 35-ton Denison Multipress. And, set-up takes only a few minutes.



Some of the various electronic parts formed by Multipress at Amperex.

Quick
die changes
with **DENISON**
MULTIPRESS®
saves manhours

*A way to cut costs
on short-run metal-forming*

SHORT RUNS, frequent die changes. That was the production problem at Amperex Electronic Corporation, Hicksville, New York.

Now, Denison hydraulic Multipress makes set-ups faster than possible with fixed-stroke presses. With Multipress inching control, the ram can be inched to the convenient point for attaching dies. And the smooth, variable hydraulic stroke gives set-up men perfect control of the ram.

Amperex uses three Multipresses for blanking, piercing, forming, drawing and broaching steel and non-ferrous metals . . . to produce a wide variety of shapes and sizes.

This is one example among many where Multipress is cutting costs in the 1-to-75-ton pressure range. For help on your particular application, call a Denison Hydraulic Engineer.

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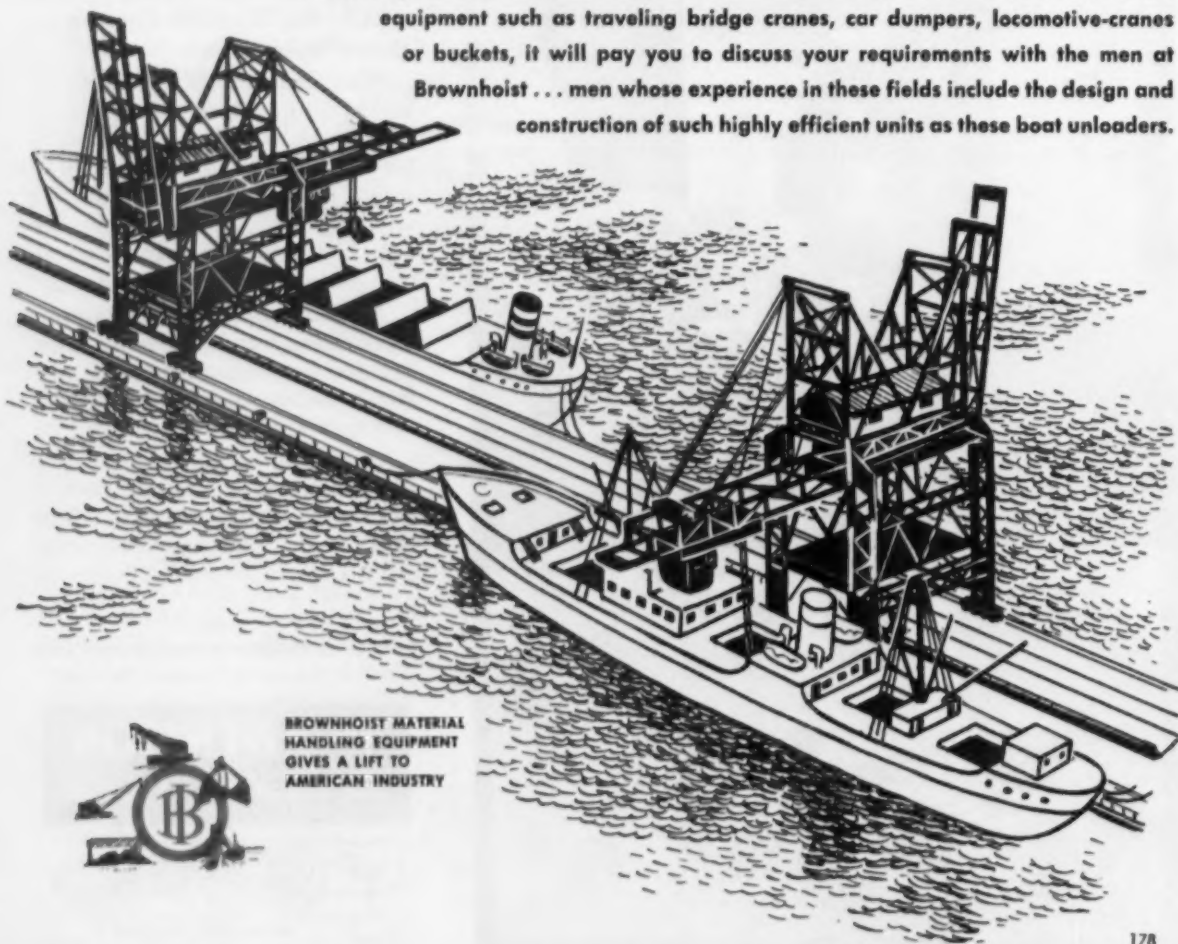


BROWNHOIST

**ORE UNLOADERS handle up to 3600 tons per hour
at the huge new pier of a large eastern railroad**

Two Industrial Brownhoist Ore Unloaders, each with a free-digging capacity of 1800 tons per hour, provide this new pier for ocean-going ore vessels with the most modern and efficient unloading facilities in the United States. Towering over the pier like enormous drawbridges, the Brownhoist machines can travel the full length of the pier and lower apron extensions from either side to provide a reach 72 feet from the dock. Then huge buckets, capable of taking 25 tons of ore in a single bite, roll out on the aprons, return to drop their load into 100-ton receiving hoppers and roll back again for another bite. Elapsed time from bite to bite: just 45 seconds.

Whether your bulk materials handling operations call for ore unloaders or for other equipment such as traveling bridge cranes, car dumpers, locomotive-cranes or buckets, it will pay you to discuss your requirements with the men at Brownhoist . . . men whose experience in these fields include the design and construction of such highly efficient units as these boat unloaders.



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Report To Management

Inventory Buying Sustains Strength

Many businessmen were slow to realize the importance of inventory liquidation in bringing on the so-called recession of 1954. If you were in this group, don't find yourself today underestimating inventory rebuilding in 1955.

Inventories are relatively low today in relation to sales. This is in spite of terrific production that has resulted in records for steel, automobiles and other goods, both consumer and industrial.

Up to the present, most of the production has not gone into inventories. This is particularly true of industrial goods. Inventories of consumers goods have risen slightly.

Most manufacturers are living from hand to mouth. For example: the auto company steel buyer who would like to see just 2 weeks of daylight in his inventories.

This means that inventory buying, the type that has characterized most booms of significant size, is still ahead for most industries. This will mean no reduction of orders for steel, aluminum, copper and finished parts for a long time. Inventory rebuilding will be a big factor whenever the current frantic production pace shows signs of slowing.

Households Will Spend

Latest look into spending plans of America's buying public by the Federal Reserve Board shows that more people intend to buy cars, still more intend to buy major appliances.

An estimated 15 pct of the "spending units" of the nation plan to buy a car this year, 28.5 pct plan to buy major household items. These percentages are up from 1954, but do not match the increase in buying that has occurred already. But purchases will run higher. Last year only 26.9 pct intended to buy appliances, but 44 pct actually did.

They will pay more for cars, less for appliances. Potential new car buyers intend to spend \$2700. That's \$200 more than last year, reflecting more extras or perhaps a social upgrading. But planned expenditures for appliances will be down \$50 to \$250, reflecting a softening of prices and a shrewdness in bargaining that characterizes appliance merchandising.

Some seasonal factors will creep in, particularly in the automobile market. It is estimated that 4.1 pct of the households plan to buy their cars in the first 6 months of the year, about 3.3 pct in the second half.

Automakers will try to alleviate second half blues, or do away with them altogether. New model introductions have already been set back from first plans because of the continuing strong market. New lines in October or November will sharpen buying appetites if a lag appears.

Manufacturers Also Buy

Makers of industrial equipment are enjoying the same boom that exists in consumers goods. A major factor of the whole trend is to improve manufacturing methods, increase production, cut costs but improve quality.

Industrial heating industry is an example. This industry is 79 pct ahead of 1954 and April was actually 119 pct ahead of the same month for the previous year.

Spokesmen for the industry point out that a downturn similar to the post-Korea period is not going to occur. They contend that users are taking advantage of the technical advances made by the industry in recent years.

Purchasing agents report that orders are still increasing. A full 33 pct expect the second half to eclipse the first.

INDUSTRIAL BRIEFS

Blast Furnace Back . . . The No. 2 blast furnace at Kaiser Steel Corp. Fontana mill is back in operation after one of the fastest relining jobs in the history of the industry. The facility was completely relined in 43 days. A brick-laying crew from the A. E. Anderson Construction Corp., Buffalo, augmented Kaiser's own crew of mechanics and riggers. Kaiser's three blast furnaces are the only ones on the Pacific Coast.

Bought Out . . . Teer, Wickwire and Co., Jackson, Mich., has purchased the Lindberg Air and Hydraulic Cylinder Div. of the Lindberg Engineering Co., Chicago. Purchase covers entire stock, machinery, designs and development work of the division. Teer, Wickwire will immediately begin marketing air and hydraulic cylinders under the Lindberg name.

Aluminum Presses . . . Watson-Stillman Co., a division of H. K. Porter Co., has expanded its standard line of hydraulic aluminum extrusion presses with the addition of two new sizes—1400 and 1700 tons.

Company Purchased . . . Continental Can Co.'s purchase of patents and production facilities of Vaporized Metal Coatings, Inc., has been approved by boards of directors of both companies. Vaporized Metal Coatings has been engaged in development and commercial utilization of machinery and methods for high-speed, continuous metal coating of metals and non-metals by means of evaporation in vacuum.

Plant Acquired . . . Beloit Tool Corp., Beloit, Wis., has acquired a plant for manufacture of high speed ground thread taps. The plant, to be operated by the Regal Div. will be in full production in June.

Titanium Plant . . . National Research Corp. has received a \$1,183,495 contract from General Services Administration to finance construction and operation of a demonstration pilot plant for production of titanium metal by a new non-Kroll process developed by the company. The plant, designed for production of 1000 lb of metal per day, will be housed in a building near the site of the company's Equipment Div. in Newton, Mass.

Scrap Office . . . The David J. Joseph Co., scrap brokers with headquarters in Cincinnati, has opened a new office in Pittsburgh. The office will be located in the Gateway Center.

Builds Dam Parts . . . Baldwin-Lima-Hamilton Corp., Philadelphia, has been awarded a contract for about \$750,000 to furnish penstock and spillway gates and gate hoists for the Table Rock Dam, a combination flood control and power generation project located on the White River near Branson, Mo.

Merger . . . The Colson Corp., Elyria, O., has become a wholly-owned subsidiary of Great American Industries, Inc., Meriden, Conn., through an exchange of stock of the two companies. A previous agreement between Colson and the F. L. Jacobs Co., Detroit, has been rescinded by mutual consent.

"KRANE KAR Exceeded Our Expectations,"

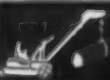
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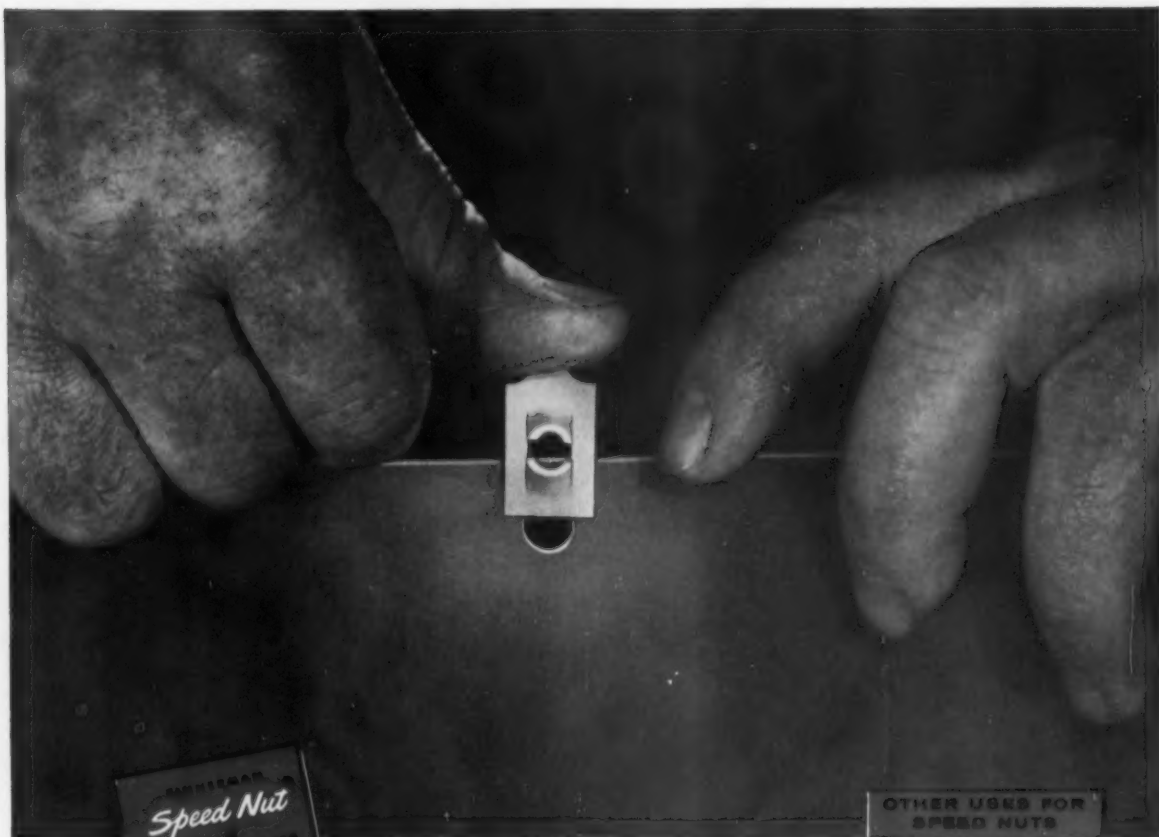
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"Silent Hoist" KRANE KAR Swing-Boom Mobile Crane... 1½, 2½, 5, 10, 12½ Ton Capacities



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Thumb Replaces Spot Welder with Tinnerman SPEED NUTS!

Here is a typical assembly-line scene . . . a Tinnerman "J" type SPEED NUT being applied to a panel where a weld-type fastener was formerly used. That's the way to cut assembly costs—by saving precious man-hours and eliminating the need for special skills, tooling and equipment!

This one-piece, self-locking, spring steel SPEED NUT brand fastener not only makes welding unnecessary, but it also eliminates clinching, staking, tapping, and costly threaded inserts. It snaps in place by hand quickly, easily, and provides a heavy-duty vibration-proof attachment. Self-retained in screw-receiving position, it is ideal for blind-location assembly.

"J" type SPEED NUTS are available for a full range of screw sizes and panel thicknesses. In all, there are more than 8000 variations of SPEED NUT brand fasteners to help you reduce assembly costs. See your Tinnerman representative soon . . . and write for your copy of SPEED NUT "Savings Stories."

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"J" type SPEED NUTS eliminated problems of hole misalignment and paint clogging on heating unit.



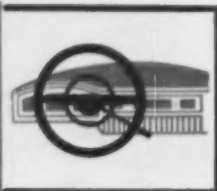
Assembly costs cut 50% on farm equipment with "J" type SPEED NUTS.



"J" type SPEED NUTS helped plastic sign maker to 48% assembly savings.



More than 8000 shapes and sizes



Smog Will Linger Over Los Angeles

Tests indicate catalytic auto muffler not yet perfected

. . . Muffler removes 80 pct of smog-causing hydrocarbons, but efficiency drops off after 2000 miles . . . Work will continue—By T. L. Carry.

♦ **SMOG-BOUND** Los Angeles residents, who suffer from 1016 tons of hydrocarbons emitted daily from the area's 2.5 million cars, are going to have to wait a little longer for relief in the form of a catalytic muffler. (THE IRON AGE, Jan. 27, 1955, p. 39.) Tests have shown that it is not yet ready for public use.

The muffler was designed by Eugene F. Houdry, president of Oxy-Catalyst, Inc., Wayne, Pa. Mr. Houdry has used catalysts successfully in connection with exhausts from industrial plants. Idea was applied to car exhausts.

The Southern California Air Pollution Foundation, an independent organization set up to combat the smog problem, spent \$50,000 testing the muffler to see if it would eliminate a large percentage of auto exhaust gases over a long period of time without having to be replaced or repaired.

The tests were originally scheduled for 20,000 miles but were called off after 10,000 miles when scientists decided that the muffler is not yet a perfected smog eliminator.

Make Smog Study

Government research into the causes and prevention of smog will be expanded and more federal aid will go to states and cities for smog investigations if Congress follows recommendations of a Senate subcommittee. The subcommittee has reported favorably a bill sponsored by



WALLOWING over boulders on Goodyear tires carrying 3 to 5 lb pressure, Army "Teracruzer" has no springs, was built by Four Wheel Drive Auto Co.

Efficiency Dips . . . Four of the Houdry mufflers were put on different makes of cars for the tests at the Southwest Research Institute proving grounds at San Antonio, Tex. The tests showed that the muffler was capable of remov-

ing more than 80 pct of an auto's emission of hydrocarbons but the efficiency of the catalyst decreased in varying degrees after 2000 miles.

The driving tests included speeding up and slowing down, idling and cruising, going uphill and down, and following courses on level roads. Exhaust gases were examined at the end of every 1000 miles to see how well the catalyst was working. In addition, the engines were examined and there were no signs of excessive engine wear due to use of the muffler.

Needs More Work . . . Dr. W. L. Faith, vice-president and chief engineer of the Air Pollution Foundation, said that further development will be required before the

Sen. Thomas H. Kuchel, R., Calif., which directs the U. S. Surgeon General to prepare comprehensive programs for the elimination or reduction of air pollution. Federal funds will also be available to local governments for specific anti-air pollution projects.

Unique Plastisols make metal finishing news

◆ Tough, thick, rubber-like chemical resistant coatings have opened up new opportunities for far better metal protection at lower cost . . .

◆ Application limitations overcome by vinyl compounds developed by United Chromium . . .

Plastisols are viscous, resinous liquids that take on a rubbery look and feel when baked. They form thick, chip-proof vinyl coatings with exceptional corrosion resistance, and high dielectric strength. In the past, application difficulties limited their use. But plastisols have become real production coatings now . . . applicable by almost any conventional method.

SPRAYABLE—EVEN UP TO 20 MILS THICK

The first practical sprayable plastisol, Unichrome Coating 5300 has extended use of plastisol corrosion control to large metal objects. Even ductwork and tanks. You can now spray seamless protection 20 mils thick per coat onto ordinary metals to fit them for severest service.

COLD DIPPING—3 TIMES FASTER

Unichrome Coating 4129 solves the problem of economical dipping of wire goods. It permits dipping at room temperature . . . 3 times faster than previous cold dip compounds, and using only half as much plastisol material. Refrigerator shelves, freezer baskets and the like are now getting the better protection of plastisols more economically.

In these two singled-out examples, you see what United Chromium strives to do with all its metallic finishes, organic coatings, dip finishes and equipment . . . to help you cut finishing production cost, or produce a superior product through a better finish. We'd welcome an opportunity to work with you.



METALLIC and ORGANIC FINISHES...EQUIPMENT

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Bundy solves refrigeration problem with unique tubing strainer design

**Read how Bundy Engineers
work with designers to
help make better products**

As a designer, you undoubtedly know that Bundy is the leading manufacturer of small-diameter steel tubing. You've probably seen it specified many times.

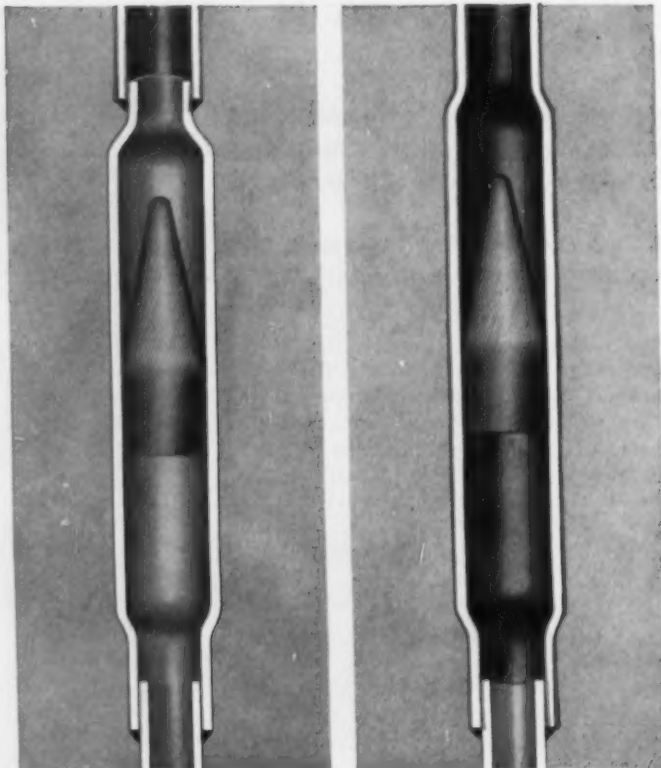
But, for *you*, there is more than manufacturing going on at the Bundy Tubing Company.

Shown at the right is a typical example of the help you can get at the design stage of your product. It is just one of hundreds of contributions which have been made by our engineering staff, in many widely diversified fields.

Take advantage of this unbeatable Bundy combination: expert, free engineering service plus genuine Bundyweld Tubing, the only tubing double-walled yet stronger; has high thermal conductivity, high bursting strength; takes easily to any fabricating operation. It is the safety standard of the refrigeration industry, and is used in 95% of today's cars, in an average of 20 applications each.

Let Bundy help you with that tubing design problem. Call, write, or wire us today:

**BUNDY TUBING COMPANY
DETROIT 14, MICHIGAN**



Problem: Because refrigeration systems can be quickly ruined by dirt particles which lodge in capillary tubes, most systems use a separate strainer assembly, as shown above. The two extra solder joints used to install the strainer assembly give rise to an even greater problem—leakage. Expensive hand assembly methods also frequently introduce dirt into the system.

Solution: New Bundy design actually makes strainer an integral part of condenser coil. The coil end is expanded to receive the strainer or filter and then swaged down to capillary size. This ingenious design eliminated one solder joint with its consequent risk of leakage or dirt inclusions; resulted in a cost savings of 50% to the customer.



NOTE the exclusive Bundy-developed beveled edges, which afford a smoother joint, absence of bead, and less chance for any leakage.

BUNDYWELD TUBING®

DOUBLE-WALLED FROM A SINGLE STRIP

muffler can be recommended by the Foundation as a solution to the Los Angeles auto exhaust and smog problem.

The muffler's decrease in efficiency was caused by mechanical design problems and loss of activity of the catalyst, Dr. Faith said. He added that because design changes are necessary, no attempt was made to rejuvenate the catalyst once its activity started to decline.

The mufflers have been shipped back to Mr. Houdry's plant in Pennsylvania for further study and checking by engineers.

Dr. Faith said Mr. Houdry is confident that the catalytic muffler can be improved within a short time. But, Dr. Faith added, the Foundation has made no decision as to whether or not it will run the tests again once Mr. Houdry feels that he has improved the muffler sufficiently.

Health:

Doctors incorporate auto instrument in stethoscope.

The Surfacage, an instrument developed by General Motors Corp. and used in machine shops and manufacturing and assembly plants to measure the roughness of highly machined auto parts such as gear teeth, bearings and crankshafts, has come to the aid of medical science.

An Electro Stethograph has been developed cooperatively by General Motors Research Laboratories Div. and the Medical College of South Carolina. The instrument was developed by combining the diaphragm of a physician's stethoscope with the pickup of the Surfacage.

Some of the heart's faint sounds, which neither the human ear nor a stethoscope can hear, can now be seen either with an oscilloscope, or on a direct writing device that leaves a permanent inked record.

Better Heart Check

Medical researchers believe that the low frequency vibrations that are picked up by the instrument will offer new clues to the heart's behavior. They may indicate whether a heart functions nor-



GM'S Surfacage has gone to work for medical science in the Electro Stethograph, an adaptation for heart research.

mally or is affected by some disease or defect.

Dale Groom, M.D., assistant professor of medicine at the Medical College of South Carolina, proposed the idea for the new instrument. He was aided by Charles F. Kettering, GM research consultant, who suggested that the Surfacage might be adaptable to the medical job.

AUTOMOTIVE NEWS

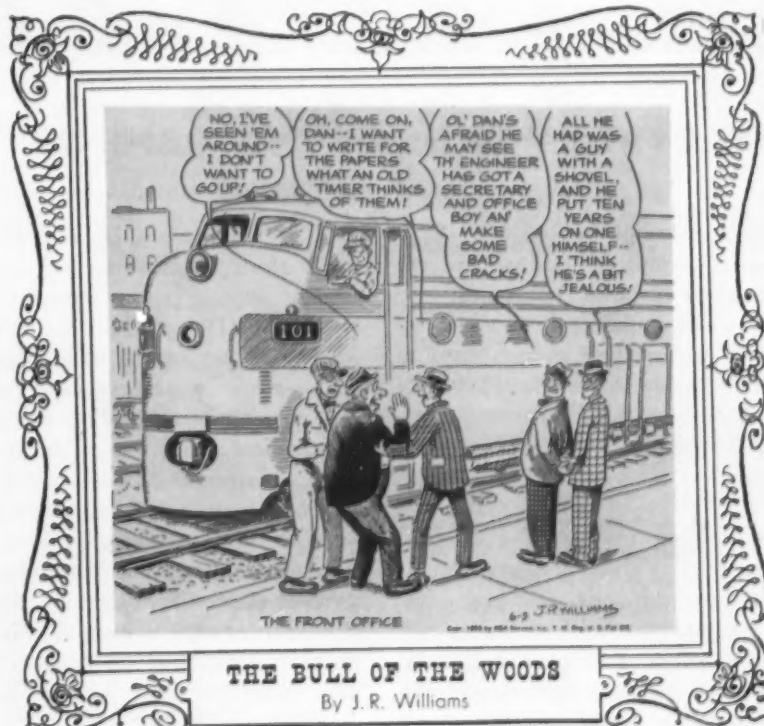
Boost Rambler Output

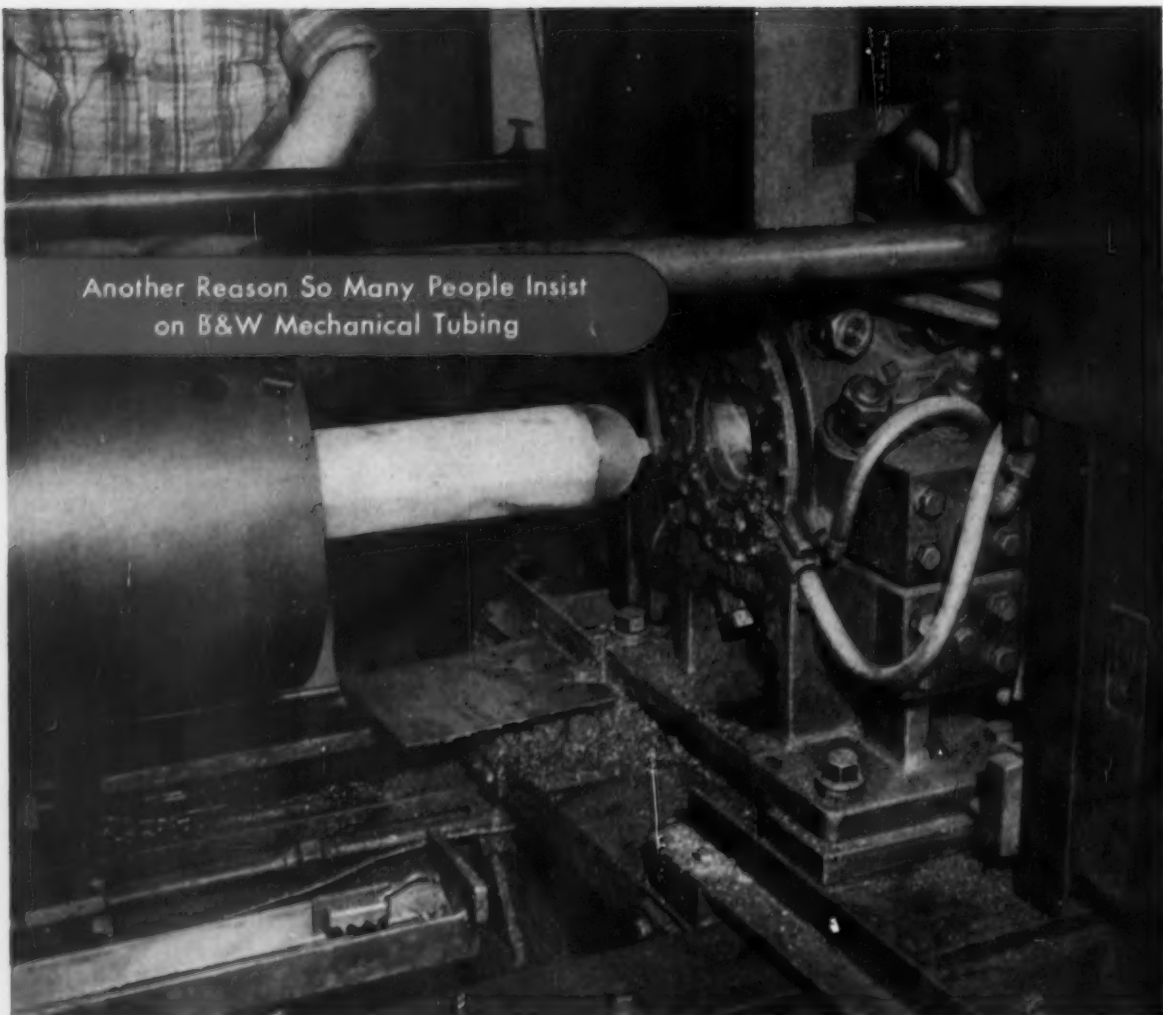
American Motors Corp. will increase its Rambler production capacity by 60 pct this summer, according to George Romney, president.

The expansion, part of a \$60 million program announced earlier this year, will increase Rambler output by 300 units a day at the corporation's main plant in Kenosha, Wis. The company reports that sales during the last 6 months have more than doubled in comparison to the same period last year.

Included in the new program is the construction of a new and separate assembly line for the Rambler. Previously, the Rambler and all other Hudson and Nash cars were built on the same line. Production, however, will still remain highly integrated, Mr. Romney said.

The expansion will boost American Motors' total production capacity to 1900 units a day.





Another Reason So Many People Insist
on B&W Mechanical Tubing

EVERYBODY WINS IN THIS GAME OF "SPIN THE BOTTLE"

Hoke, Inc., of Englewood, N. J., makes sampling bottles for the chemical process industries — to carry and contain a wide variety of fixed or liquefied gases, many of them highly corrosive. From the start of its operation in 1949, Hoke has insisted on B&W seamless stainless steel tubing, to be spun into bottles, in preference to competitive methods of deep-drawing or cold extrusion. Valves are attached at either or both ends.

The uniform wall thickness and concentricity characteristic of B&W stainless tubing contribute to the safety factor for which Hoke spun

bottles are famous. Because Hoke uses short lengths of tubing, its quality control people have the advantage of 100 per cent inspection of the tubing stock used. Higher standards of cleanliness and safety are possible because of the uniform mechanical properties of the stainless tubing, and Hoke's automatic spinning operation (10 to 15-second production time cycle).

Whatever *your* requirements — carbon, alloy or stainless — you can do better with always-uniform B&W tubing. Get in touch with Mr. Tubes, or write for *Technical Bulletin 365 1A*.



THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION

Beaver Falls, Pa. and Milwaukee, Wis.:
Seamless Tubing, Welded Stainless Steel Tubing
Alliance, Ohio: Welded Carbon Steel Tubing
Milwaukee, Wis.: Seamless Welding Fittings

TA-5006(M)



White House Shuns Strike Mediation

Administration rules out intervention unless national interest at stake . . . Policy places added bargaining load on management, labor . . . Move called healthy but disputes may drag—By G. H. Baker.

♦ LABOR and management alike must get used to the idea of settling their differences without help from Washington in the months ahead. The White House has quietly resolved to keep its nose out of all labor disputes except those involving public safety or the nation's security.

As a result, union and company officials must learn to walk without the crutch of federal bargaining directives. No longer can management "walk through" its role in bargaining, confident that a settlement will be dictated by Washington mediators anyway. This "why bother?" attitude is already behind the times.

Take it from Joseph E. Moody, president of the Southern Coal Producers' Assn. and an experienced Washington hand at labor negotiations, there's plenty to "bother" about now. Mr. Moody is warning his associates to expect a still greater degree of this "hands off" attitude with respect to labor disputes.

End Federal Prodding . . .

Neither side, he warns, can expect a bail-out job from Washington. Final settlements now must be arranged at bargaining tables without any prodding from federal experts.

Management must beware the pitfalls that confront "lazy" (that is, sit back and let the government dictate settlements) companies. Today, the situation is sharply different, and management's labor experts had better brush up on bargaining procedures.

If you are facing a labor dis-

pute, says Joe Moody, be sure you are right. If so, be prepared to carry through on the dispute.

"If I interpret the attitude of this Administration correctly, the government isn't going to come to your rescue," he warns.

"It may mean some bitter struggles," he says, "and it may prolong many disputes, but to my mind, it is the most wholesome development in the relationship between business and its employees in many, many years."

Limit Missile Buying . . . Progress in the design and engineering of all types of guided missiles is going forward at such a fast pace that the Defense Dept. is reluctant to place orders with any contractor for large quantities.

Orders now being approved by the Pentagon are for relatively small quantities. This results in a higher unit cost than the government would like to see, but ordnance experts figure it would be

folly to stock up on large quantities of missiles that may soon be as obsolete as Ford's Model T.

Highway Program Lives . . .

President Eisenhower's \$101 billion highway construction is far from washed up, despite the beating administered it by Senate and House Democrats. Next year may see most of the program passed.

Meanwhile, Congress puts the finishing touches on this year's relatively smaller \$20 billion program. Says one of President Eisenhower's top aides: "We're not discouraged. On a program as big and important as this, you need a couple of dry runs through Congress in order to work up to something worthwhile."

Fear Strike Effects . . . Washington's concern over the ability of Ford and General Motors to meet their defense contracts mounts as strike-talk spreads. Procurement chiefs are scouting

What's New With Chromium

■ A new study of chromium electroplating methods to discover new ways to improve plating efficiency and plate quality is described in a Rensselaer Polytechnic Institute research report now available through the U. S. Commerce Dept.'s Office of Technical Services.

■ The studies, sponsored by Army Ordnance Corps, concern fundamental principles of chromium deposition. Experiments described in the report include current-voltage curve measurements and radioactive tracer studies, and indicate that poor plate quality is often due to effects of hydrogen evolved in the process. Booklet, "Chromium Electroplating," is available for \$5 from Office of Technical Services, Washington 25, D. C.



what's new?

NUMBER 32 OF A SERIES



seven hardening jobs on one flamatic

You might look for a lot of fancy tooling on the Standard Flamatic that hardens all these jobs. You won't find it.

Instead, you'll find a single, work-holding fixture and two pairs of standard flame heads, changed over in minutes to switch from one job to the next. These parts are made by a manufacturer of automotive transmissions whose schedules and varying lot sizes make the heat treating virtually a job-shop operation.

Flamatic keeps the pace, maintains part-to-part uniformity, holds costs in line, and gives the maintenance people practically no trouble. Flamatic holds temperatures in line with electronic control, operation is pushbutton except for loading.

To find out how versatile Flamatic selective hardening can be, write for Publication No. M-1861.



flamatic

PROCESS MACHINERY DIVISION

THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO, U.S.A.

the plant potentials and plant capacities of smaller (less likely to be struck) producers of automotive equipment, hopeful that they can secure firm commitments to take up at least some of the slack a strike would bring.

At the Pentagon, ordnance chiefs say a United Auto Workers strike against General Motors and Ford would frankly knock an agonizingly big hole in the total output of all ordnance items.

The odds are on a strike, Washington is told by Frank Rising, general manager of the Automotive Parts Manufacturers Assn. Except that there's one big "if," he suggests:

"If Walter (Reuther) maintains his position which he has maintained up until now and shows no sign of acceptance of anything less than the demand he has been so firm and complete and explicit about, I think there will be a strike.

"I do think Walter thinks he is going to get the GAW. He is not just putting on a show to keep rank and file interest.

"I think Walter expects to get this, or a piece of it, or enough of it so he can say, 'I made a start on it, and I will get the rest of it later.'"

Mergers:

FTC admits market survey in trust action.

A tabulation of reported market facts is admissible in evidence in an antitrust case, even if the facts are gathered by mail, the Federal Trade Commission has ruled.

FTC ruled that government attorneys could submit as evidence a tabulation summarizing information received in answer to a mail survey to give a general market picture. The ruling came in the government's case against Crown Zellerbach Corp., San Francisco.

The suit alleges that the firm violated the Clayton Act by acquiring the assets of the St. Helens Pulp and Paper Co., St. Helens, Ore. Combined sales of the two firms are over \$260 million a year.

The market fact tabulation was submitted to show that the firms are two of a trio of companies responsible for 85 pct of total sales of paper products in 11 western states. The disputed tabulation concerned dollar volume purchases of paper converters and jobbers from West Coast manufacturers.

FTC denies arguments by Crown Zellerbach that such a tabulation is inadmissible because it was made by mail, and because persons who supplied the information are unavailable for cross examination.

Reds:

Ex party member says 100 do defense work.

There are about 100 known Communists working in Eastern Pennsylvania defense plants, according to new testimony given Congress during the continuing subversive investigation.

Latest batch of Reds were named by a former Communist member of the United Electrical, Radio and Machine Workers Union (Ind.). Named are employees of several electrical firms. Many of them are union officials, witnesses said at hearings of the Senate Internal Security subcommittee headed by Sen. James O. Eastland, D., Miss.

Could Halt Production

Industry and some lawmakers are fearful that potential subversives in defense plants, or related industries, could tie up vital pro-

duction if a shooting war broke out. Present laws permit removal of suspected subversives from classified jobs, but not from defense plants.

The Eastland subcommittee, which does not pass on legislation officially, is pushing passage of a bill sponsored by Sen. John M. Butler, R., Md. Bill would permit the President to bar persons who might "reasonably be expected to commit sabotage, espionage or subversion" from defense plants, utilities, transportation, and other vital facilities.

Order Titanium Tests

An agreement signed with General Services Administration by Monsanto Chemical Co., of St. Louis, and National Research Corp. calls for testing of a new fused salt process for titanium production.

At Newton, Mass., National Research will operate a pilot plant with a rated capacity of 1000 lb per day. GSA will pay the costs of the experiment, estimated at more than \$1.1 million, but the firms will get no fee. If the process proves feasible and commercial production results in 10 years, the government investment is to be repaid.

Slash Ship Program

Shipbuilding industry, for years hungrily eyeing promises of chubby government-sponsored contracts, will see some of this aid vanish if the Senate follows recommendations of the House.

The House sliced a healthy \$38.1 million off funds requested by the Maritime Administration for new merchant ship construction in private shipyards.

Lopped off the requested fund for ship construction was \$23.5 million for a proposed high-speed tanker and two "austerity" cargo ships. Another \$11.5 million was cut from the \$23 million asked to build 10 tankers under the "trade-in-and-build" program. Action leaves \$64.7 million for ships.



"I find it's much cooler this way."

EVOLUTION of MULT-AU-MATIC PROGRESS

Since 1914 the Bullard Mult-Au-Matic has reflected engineering and design progress required to fulfill industry's needs — until today, the Type "L", is the optimum for machines of its type.

Here are some of its features...

CONTROL SYSTEM

Advanced design of electro-hydraulic controls provide a readily accessible and simple control system for both Set-Up and Automatic machine operation.

FEED MECHANISM

Completely new screw type feed works insures smooth constant rate of advance of tool slides through any desired part of a 16" stroke with 81 feed changes ranging from .0025 to .0625.

SELECTIVE SPINDLE SPEEDS

Range from 35 r.p.m. to 1,000 r.p.m. at each station providing the correct cutting speed to suit the specified operation.

CARRIER INDEX

The new indexing mechanism with improved carrier column bearing permits faster index of spindle carrier thereby reducing time between cuts. New design index mechanism registers and locks carrier, on successive indexes, to within $\pm .0005$.



PLAN TO SEE OUR
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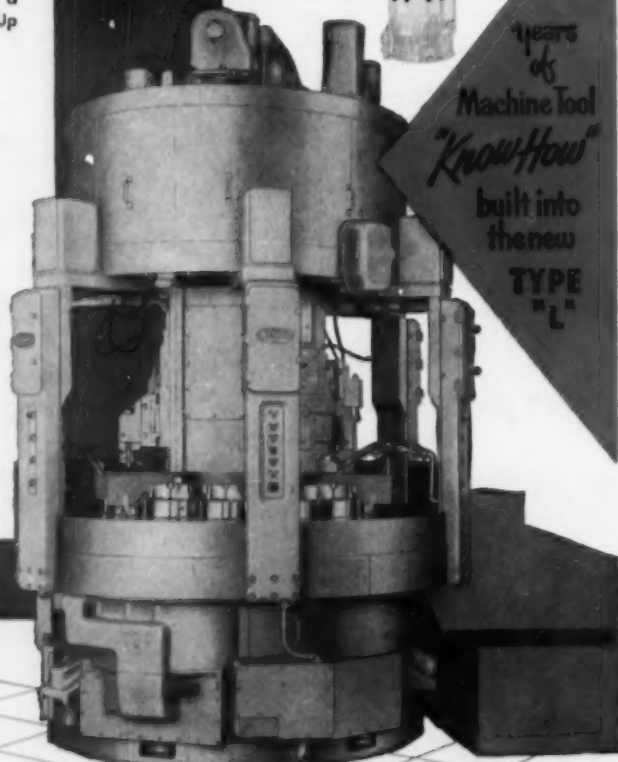


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MULT-AU-MATIC TYPE "L"

Available in these sizes
10" with 6, 8, 12 or 16 spindles; 14" and 18" with 6 or 8 spindles.

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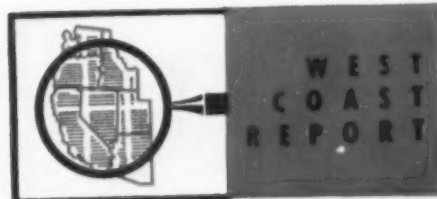
1914

1919

1930

1947

years
of
Machine Tool
"Know How"
built into
the new
TYPE
"L"



West Steelmaking at Near Record

Producers look for 17 pct increase over 1954 . . . An extra boost could pass 1953 pace . . . All products up except for few categories where volume was transferred to other products—By R. R. Kay.

♦ **DON'T BE SURPRISED** to find 1955 far Western finished steel output at a new high!

Steelmakers here look for a healthy 17 per cent increase in finished products over 1954. That's only 150,000 tons below 1953's all-time high of 3.6 million tons. And another five per cent rise would make 1955 the equal of record 1953.

But the way steel business is humming right now, these estimates could well prove out too low, and 1955 wind up as the new banner year.

Few Minus Signs . . . Also behind this year's happy outlook is inventory rebuilding by steel users after last year's stock reduction program.

An **IRON AGE** regional survey shows plus signs for all products except plates for general fabrication (—9 pct) and hot- and cold-rolled strip (—2 pct).

Here's how the product-by-product picture shapes up for 1955:

PLATES: Total plate produced will be up. While plate for general fabrication will be down nine per cent, plate for line pipe will increase—shows up in estimated higher pipe production.

HOT- AND COLD-ROLLED STRIP: Demand will be just under 1954.

HOT- AND COLD-ROLLED SHEETS AND TINPLATE: The 20 per cent jump will come from: (1) greater tinplate production capacity, (2) an expected record year for metal can shipments, and (3)

big demand for sheet products by manufacturers of water heaters, forced air furnaces, automobile parts, and other sheet-using industries.

STANDARD AND LINE PIPE: Huge orders for Pacific Northwest natural gas transmission lines account for much of the 51 per cent estimated rise. 1954's poor market helps make this year's forecast look exceptionally good. Greatest part of production is in large diameter pipe produced by Columbia-Geneva Steel and Kaiser Steel. Irrigation projects throughout the West contribute to the increasing demand for pipe.

STRUCTURALS AND BARS: 1955 looks like a record year for housing starts and heavy construction in the far western states. Mills here plan to expand production to meet demand. Bethlehem

Pacific Coast Steel is the big producer in this category.

WIRE PRODUCTS: Inventory adjustment apparently occurred in 1953 rather than 1954. Shipments last year were closer to consumption. The 17 per cent boost predicted for this year will come from stepped-up business activity. Furniture and automobile seat spring manufacturers will play an important role.

Rack Eng. Co., Connellsville, Pa., opened a Los Angeles-area plant to make materials handling equipment . . . Burdett Oxygen Co., Cleveland, is expanding its Los Angeles branch plant for production of commercial oxygen . . . Elgin National Watch Co., Elgin, Ill., bought its third West Coast plant in six months: Advance Electric & Relay Co., Burbank, Calif., electrical relay-switch makers.

Iron Age Estimates Western Finished Steel Output (For Seven Far-Western States—Excludes Conversion, Re-Rolling Mills)

	1954	1953	1955 Estimate*	Pct Change* 1954-55
Plates, sheared and universal	557,589	641,988	509,551	— 9
Hot and Cold-Rolled Strip	47,198	78,432	46,406	— 2
Hot and Cold-Rolled Sheets and Tinplate	915,125	920,927	1,098,177	+20
Standard and Line Pipe	302,368	583,636	456,120	+51
Structural Shapes	237,844	321,705	293,317	+23
Reinforcing Bars	392,341	392,328	439,734	+12
Other Bars and Small Shapes under 3 in.	364,857	501,491	448,661	+23
Wire Products and Wire Rods for Sale	170,705	202,722	200,000	+17
TOTAL: (Rolled Products)	2,987,727	3,643,229	3,491,966	+17
†Ingots, Blooms and Billets for Sale	44,680	115,804	37,361	—16
†Miscellaneous	23,438	19,429	25,000	+ 7

* **THE IRON AGE** and industry sources.

† Not included in rolled products total.

Efficiency in Cutting-off is Important



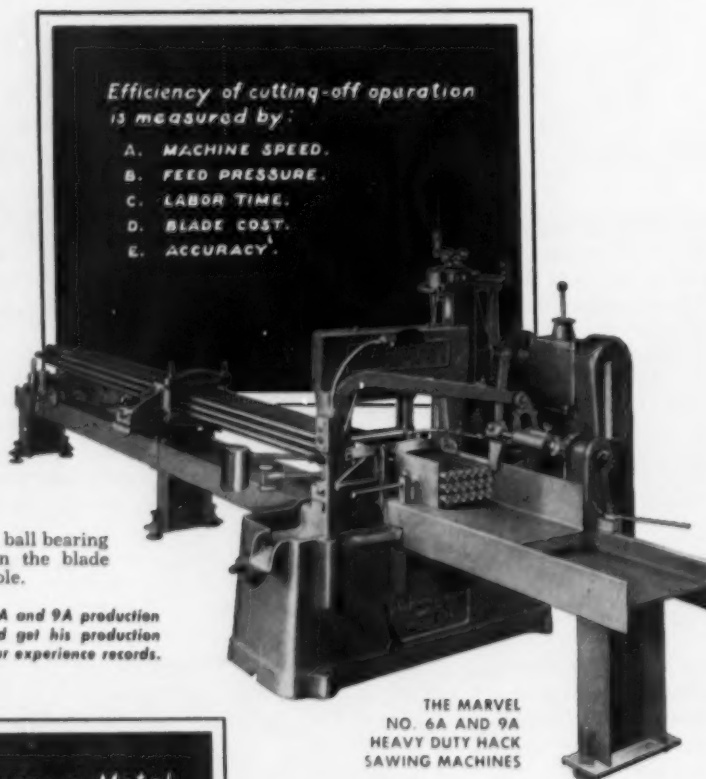
Practically all machining operations start with pieces cut-off from bars or billets. Hence, inefficiency, or lack of capacity, in the cut-off department can hold up or stagnate the entire plant.

- A. Are all-ball-bearing and provide a quick return; therefore they run **FASTER** than others on the same work.
- B. Can apply as much as 1200 pounds feed pressure—two to ten times as much as other hack saws and band saws.
- C. Are fully automatic, requiring no more operator attention than an automatic screw machine; and set-up for any bar size and cut-off length is extremely simple.
- D. Use a non-breakable high speed hack saw blade—the type of saw blade that produces the greatest number of square inches of metal cut per dollar of blade cost—two to ten times (or more) as much as any band saw.
- E. Because of their exceptional sturdiness, ball bearing reciprocating frame, ability to tension the blade "truly taut", their accuracy is dependable.

If you are not using modern, improved MARVEL NO. 6A and 9A production hack saws, call the local MARVEL Field Engineer and get his production and cost estimates on your work—to compare with your experience records.

Efficiency of cutting-off operation is measured by:

- A. MACHINE SPEED.
- B. FEED PRESSURE.
- C. LABOR TIME.
- D. BLADE COST.
- E. ACCURACY.



THE MARVEL NO. 6A AND 9A HEAVY DUTY HACK SAWING MACHINES

Formula for Accuracy in Metal Sawing:

$$ACCURACY = \left(\frac{\text{Length}}{\text{Straightness} \times \text{Squareness}} \right)$$

$$\left(\frac{\text{Straightness}}{\text{Squareness}} \right) = \left(\frac{\text{Blade Rigidity}}{\text{Blade Tautness}} \right)$$



Write for catalog C-55—showing and describing eleven different series of Metal-Cutting Sawing Machines and MARVEL High-Speed-Edge Hack Saw Blades and Hole Saws.

The composite MARVEL High-Speed-Edge Hack Saw Blade—cuts any machinable material efficiently. There is no time lost changing blades for different types of steel; no time lost replacing shattered blades, because MARVEL High-Speed-Edge Hack Saw Blades are positively **unbreakable**. These superior blades have the finest high speed steel cutting edge welded to a strong alloy steel body. They will stand-up under the highest speeds and heaviest feeds attainable on any make hack saw. Can be safely tensioned tauter than any other blade—cut-off not only straight but also square and with less stock loss.



ARMSTRONG-BLUM MFG. CO. 5700 West Bloomingdale Avenue • Chicago 39, U.S.A.



Builders Make Strong Sales Pitch

Chicago show will dramatize technical advances and savings now available . . . High labor, material costs point to still greater stress on machines . . . See gradual mechanization—By E. J. Egan, Jr.

♦ **MACHINE** tool talk centers more and more on Chicago. "The important general function of the Machine Tool Show next September will be to unveil on one stage to industry leaders, sociologists and government officials the production tools for one of the most exciting periods of technological change in this country's history.

"Its specific function, however, will be to show executives of metalworking companies how they can reduce costs, improve their competitive position and offer customers better values by progressive use of increased 'automaticity.'"

These comments about the giant show coming up in Chicago next Sept. 6 through 17 were made by Alan C. Mattison, president, Mattison Machine Works, Rockford, Ill., who is also a director of the NMTBA.

Calls Show Biggest . . . According to Mr. Mattison, the Show at the southside's International Amphitheater will be the largest machine tool exhibit ever held under one roof. Simultaneously, a Production Engineering Show at Navy Pier downtown will display mechanisms that contribute to greater automaticity of industrial production and processing.

Because this will be the first Machine Tool Show since 1947, and the very first supplemental Production Engineering Show, Mr. Mattison volunteered some background information. He pointed out that the pace of technological development and new product design in the machine tool industry

has never been as rapid as in recent years.

He said that the main fruits of present knowledge about the application of automation and automatic controls to machine tools still lie ahead.

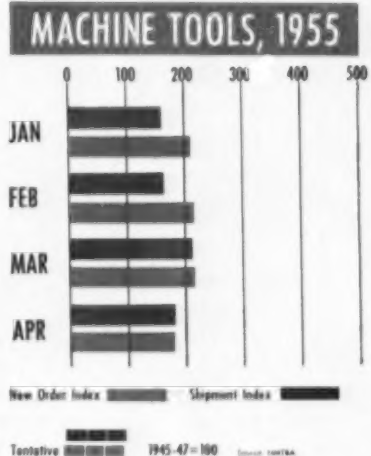
Changes Outmode Machines . . . "Nevertheless," he said, "obsolescence of a large share of capital equipment is . . . advancing with very decisive speed. With wage rates fixed (and talk now of a guaranteed annual wage), high material costs, and inflexible overhead requirements, the evolution toward 'automatic production' seems destined to continue."

See Gradual Spread . . . Mr. Mattison mentioned that low-cost principles of production won't



The Iron Age

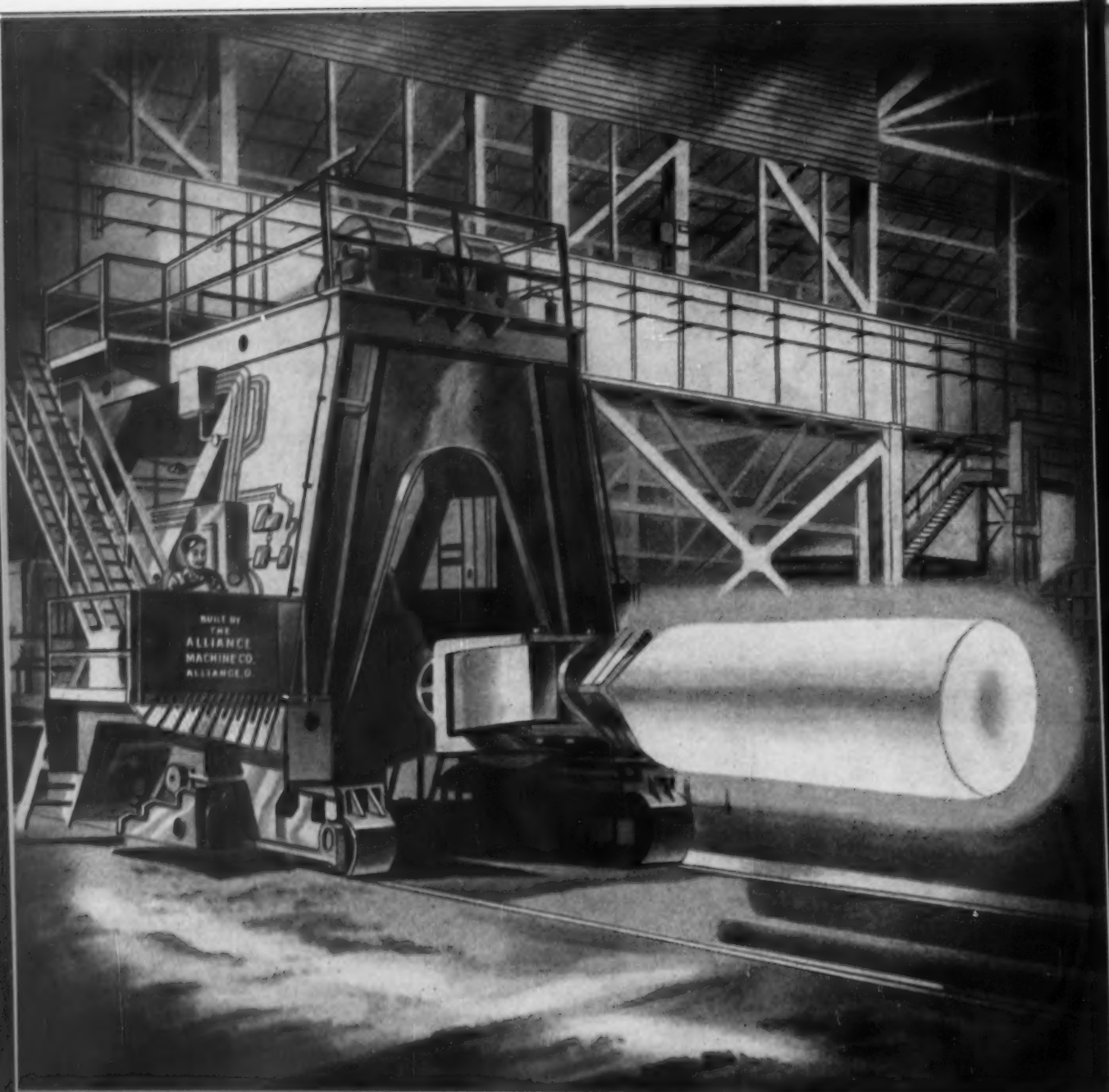
"Ever have one of those days when you just can't seem to do anything right."



wait for "packaged automation" in whole industries or complete changeover of our job-lot manufacturing methods. Automation is and will be applied first to specific operations and machines. He said it would then progress from these isolated machines and operations to complete departments and eventually to entire plants.

New order and shipment indexes for metal cutting machine tools both slipped below their March levels in April. And as a surprising coincidence, they both hit an estimated 180.8 figure, according to NMTBA statisticians. March new order index was 214.6; for shipments it was 202.5.

Estimated volume for April new orders and shipments was \$53.5 million in each category. This is \$10 million under the March new order total.



Alliance

**20-TON
FORGING MANIPULATOR**

• The Alliance Machine Company builds manipulators for all types of forging work.

The manipulator shown here is designed to handle 20-ton ingots and is equipped with hoist, leveling device, longitudinal motion and power grip revolving tongs.

This manipulator is effectively cushioned to reduce impacts, thereby reducing jar to operator and equipment.

By means of finger-tip control operator can regulate all motions from sitting position.

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The Iron Age

SALUTES

Fred Ulbrich Early recognition of stainless steel needs enabled him to build an organization that combines large mill service with the flexibility and resourcefulness of a small company.

Remember the old neighborhood garage where they made carburetor parts out of hairpins to keep tired buggies running? Fred Ulbrich and his Ulbrich Stainless Steels remind you a little of this vanishing landmark.

The Wallingford, Conn., company is entirely modern and precise in its work. Stainless strip is converted to exact specifications of temper, gage, recoil, etc. But there is a personal resourcefulness about the operation that takes you back a little.

A company with a relatively small order can get custom-rolled stainless from Ulbrich. On a low quantity basis, Ulbrich meets requirements that ordinarily call for volume schedules and heavy mill operations.

To find out how this is done you have to go back a way in the life of Fred Ulbrich. He graduated from a Wallingford high school in 1918 and went to work for a local silversmith. He left silversmithing to take up work furnish-

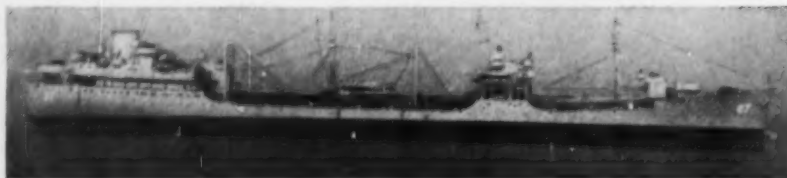
ing alloy steels for the then Ludlum Steel Co. and in 1924 established the Fred Ulbrich Co., a scrap and alloy steel yard in Wallingford. He began digging deeper into metallurgy at this point, studying at Yale, and coming up with the conviction that there is no such thing as a stock item in small quantities of stainless strip. He started buying equipment and changed from warehouse to mill operation.

Equipment accumulation and modernization have continued over 30 years to the present. The early start and the long building process have left the company uniquely equipped, Fred feels, to handle the stainless needs of the little fellow.

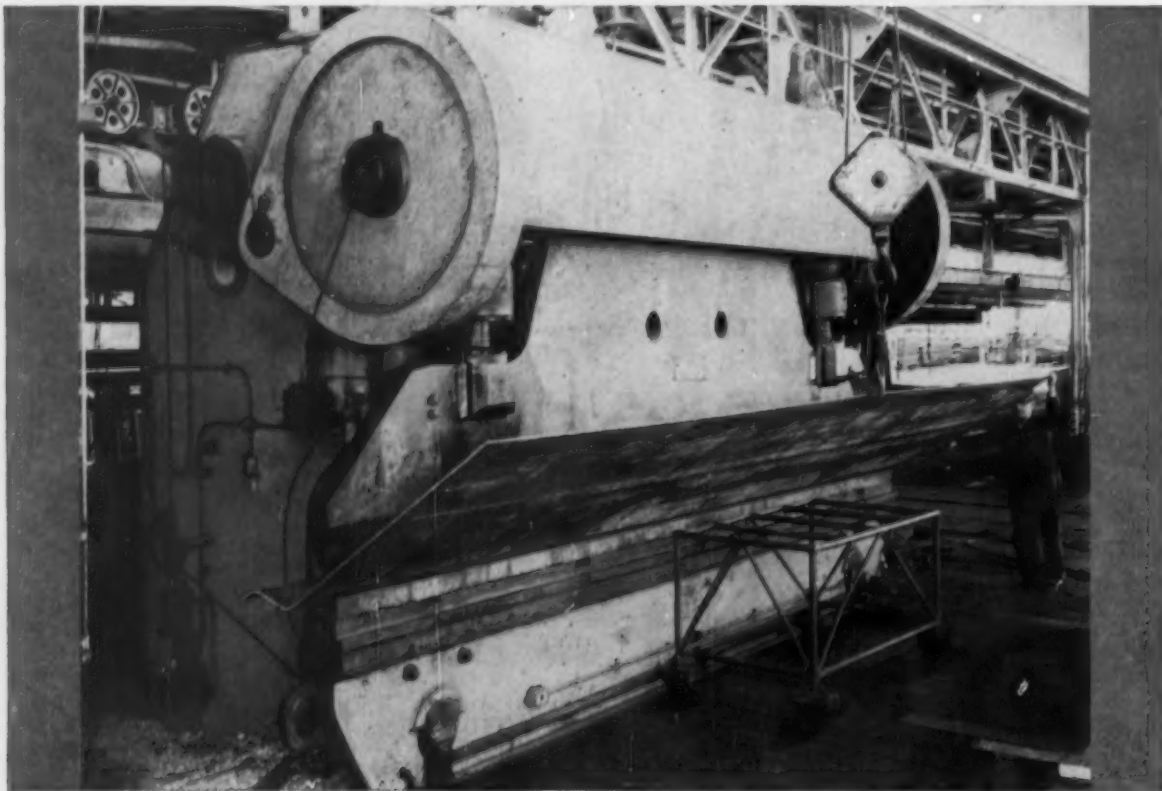
Fred Ulbrich is a good natured man, on first name terms with his men. He runs a close knit organization that can turn to on a rush job without a lot of bureaucrating and waste motion. He is an active civic leader, serving 6 years as Wallingford mayor and aiding numerous community groups. He married a local girl, has three sons, is a popular toastmaster.

U.S.S. KASKASKIA is typical of many ships which have had extensive bulkhead and other repairs at Moore Dry Dock Company.

Official U. S. Navy Photograph



Moore Dry Dock SPEEDS MARINE REPAIRS



Fluted bulkhead plate being formed by Steelweld bending press in plate shop of Moore Dry Dock Company for bulkhead

renewal job on U.S.S. "KASKASKIA" (AO27). Size of plate: length 26', width 6', thickness $\frac{1}{4}$ ".

Long a leading West Coast ship builder and marine repairs concern, the Moore Dry Dock Company, Oakland, California, has found a large Steelweld Bending Press to be a great asset in speeding the forming of heavy plate.

Ship repair, which constitutes an important part of the company's business, often requires replacement of large sections, such as bulkheads. This necessitates the forming of plates

to various shapes to accurately replace those removed. Because of the power of their Steelweld and the ease of making adjustments, this work is carried on efficiently and satisfactorily.

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The Iron Age INTRODUCES

Robert M. Reid, appointed to newly established position of traffic assistant to vice-president—sales, **Tennessee Coal & Iron Div., U. S. Steel Corp.**

J. Russell Powell, appointed works manager, Cleveland works, **Jones & Laughlin Steel Corp.** **William P. Smith**, appointed assistant works manager.

Gilbert C. Mott, appointed director of engineering, **Bridgeport Brass Co.**, Bridgeport, Conn. **John F. Kiernan**, appointed chief engineer, and **Joseph P. McNamara**, appointed assistant to the president.

George Pinkus, elected president, **Great Lakes Stamping & Manufacturing Co.**, Toledo, O.

Leo J. McPharlin, appointed purchasing agent, Automotive Body Div., **Chrysler Corp.**, Detroit.

R. E. Zahn, appointed manager, tool steel sales, Dayton District, **Allegheny Ludlum Steel Corp.**

George G. Raymond, Jr., elected president, **Raymond Corp.**, Greene, New York.

L. N. Goodell, appointed manager, **Bryant Electric Co.**, Bridgeport, Conn.

Lester E. Stevens, appointed assistant superintendent, inspection department, **Republic Steel Corp.**, Youngstown, Ohio.

Norman R. Reno, appointed works manager, Marine and Industrial Engine Div., **Chrysler Corp.**, Detroit.

Harold C. MacDonald, appointed director, **Mercury engineering office**, **Ford Motor Co.**, Dearborn, Mich. **Neil L. Blume**, appointed director of the special products engineering office. **Harley F. Copp**, named director of the Lincoln engineering office, with **P. H. Kuhn** as executive engineer.

R. F. Parker, appointed manager, carbide component sales, Carboly Dept., **General Electric Co.**, Detroit.

Lloyd J. Oye, appointed national director of marketing, **Rezolin, Inc.**

Ralph Cole, assigned to handle field service work in connection with the Ross straddle carrier, **Clark Equipment Co.**, Benton Harbor, Mich.

Robert L. Wilkerson, named manager of the general office accounting bureaus, comptroller's department, **Tennessee Coal & Iron Div., U. S. Steel Corp.**

Arthur L. Partridge, elected vice president, **Westinghouse Electric International Co.**, Washington, D. C.

Dr. Donald Q. Kern, appointed professional consultant in the field of heat transfer, Wolverine, Tube Div., **Calumet & Hecla, Inc.**

PERSONNEL



ROBERT F. BOURNE, appointed director of sales-National Accounts, **The Colorado Fuel and Iron Corp.**



EDWIN F. LORD, appointed general manager of sales, Claymont Steel Products Dept., **Colorado Fuel and Iron Corp.**



JAMES J. REYNOLDS, named vice president-operations, **ALCO Products, Inc.**, Schenectady.



TINIUS OLSEN II, elected president, **Tinius Olsen Testing Machine Co.**, Willow Grove, Pa.

George Canning, appointed planning department representative, Chrysler Corp.'s West Coast operations. Jack A. Fleming, appointed master mechanic representative, William H. Howley, appointed administrative assistant to the manager, Maxwell D. King, named packaging and material handling representative, and Cornelius J. Van Halteren, was named engineering representative.

Henry Chisholm, Jr., appointed assistant district sales manager, Cleveland district, Republic Steel Corp.

Thomas S. Craig, appointed vessel agent, Pittsburgh Steamship Div., U. S. Steel Corp., post at Sault Sainte Marie. Wayne C. Spring was named manager.

Bruce A. Young, appointed equipment specialist for the north-eastern United States, Detrex Corp., Detroit.

David L. McCausey, Jr., named sales representative, Tulsa area, Allis-Chalmers general machinery division. Thomas E. Blackwelder, named sales representative in the Jacksonville area, and Robert D. James, named sales representative in the New Orleans office. Gene Melton has been named field representative of the midwest region with headquarters in St. Louis.

Ted W. Peterson, appointed district sales representative, Leschen Wire Rope Div., H. K. Porter Co.

John S. Canterbury, appointed manager, organization and systems department, Ford Div., Ford Motor Co., Dearborn, Mich.

Emmett Geibel, appointed chief engineer, Effingham, Ill., plant, Norge Div., Borg-Warner Corp.

W. H. Osborne, elected executive vice-president, Acme Aluminum Foundry Co., Chicago.



JOHN R. MCPHEE, elected vice president—sales operations, Ironsides Co., Columbus, O.



WILLIAM R. DAVIS, appointed administrative assistant to vice-president, Steel Strapping Div., Stanley Works, New Britain, Conn.




EDWARD D. JACKSON, appointed general sales manager, Axelson Manufacturing Co., a division of U. S. Industries, Inc., Los Angeles.



JOHN J. MLYNSKI, appointed central region sales manager, Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.



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A FEW SCENES FROM THE BEHR-MANNING COLOR AND SOUND MOTION PICTURE



Contour polishing fluted areas of bits on a 1/2" free-running abrasive belt.



Removing weld bead on tubing with a free-running abrasive belt.



Mirrors for boroscopes are being shaped on this wet abrasive belt grinder.

G-12



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Unit models are also available in $\frac{1}{2}$ and $\frac{1}{4}$ yard Excavators . . . Cranes up to 20 tons capacity . . . Crawler or Mobile types . . . Gasoline or Diesel.

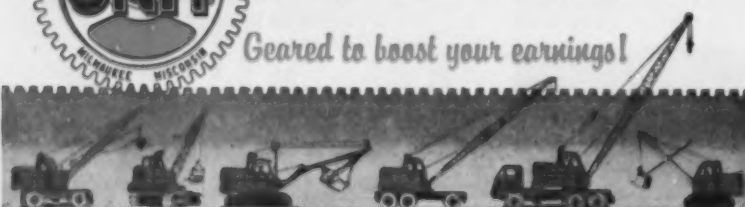


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A 8572-7/8-PC

PERSONNEL

Joe D. Robertson, appointed sales representative, Watson-Stillman Co., a division of H. K. Porter Co., Inc.

Harlan W. Burbank, named district representative-southern Ohio, western W. Va., and Kentucky, Struthers Wells Corp., Titusville, Pa.

L. E. Hedrick, appointed Pacific Coast region manufacturing & repair manager, Westinghouse Electric Corp. **R. P. Wagner**, appointed manager-distribution equipment, sales department-transformer division, Sharon, Pa.

Dr. Bernard Kopelman, named chief engineer — Atomic Energy Div., Sylvania Electric Products, Inc., Bayside, N. Y.

Ralph M. Watson, formerly director of research, Worthington Corp., appointed associate dean of the L. C. Smith College of Engineering and chairman of the Dept. of Mechanical Engineering, Syracuse University.

Leslie M. Slote, appointed director of Industrial Relations, Norden-Ketay Corp.

Carl F. Freedman, elected executive vice-president, American Agile Corp., Maple Heights, Ohio.

Frank W. Fink, named vice-president and chief engineer, Ryan Aeronautical Co.

H. D. McLeese, appointed general sales manager, Metal & Thermit Corp., N. Y.

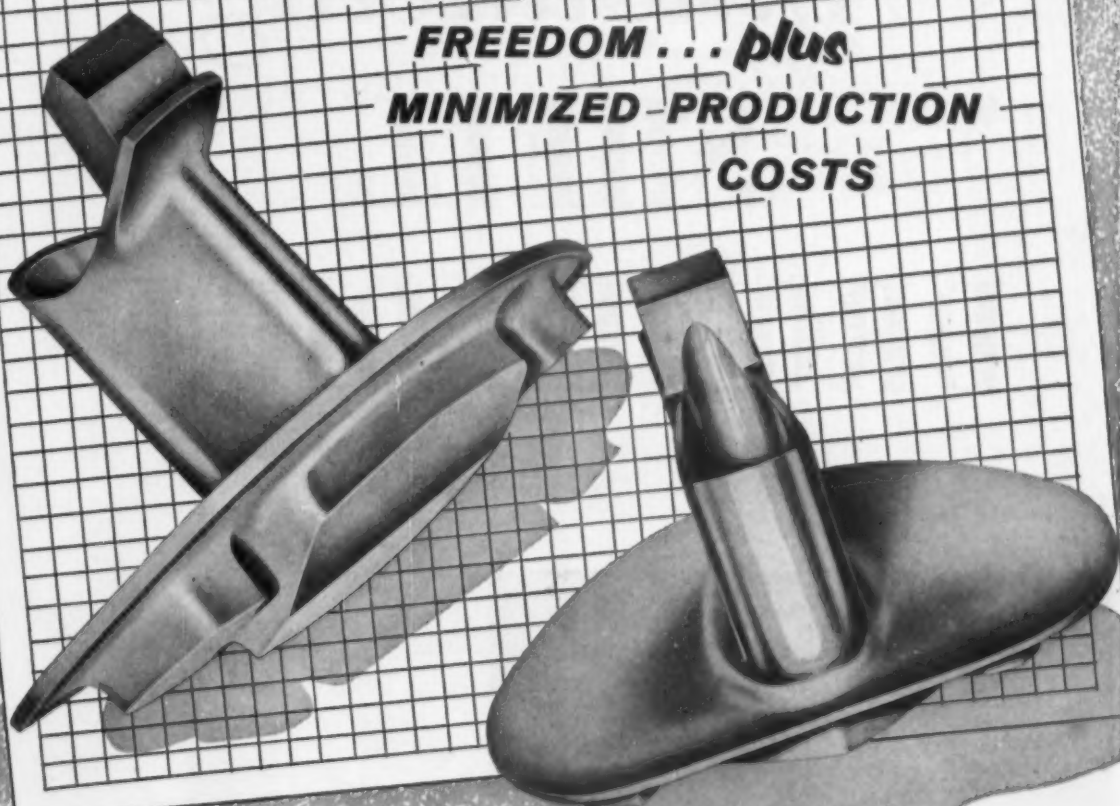
OBITUARIES

E. D. Frank, 69, director and vice-president of sales, National Automatic Tool Co.

Morris M. Miller, treasurer and credit manager, Waldes Kohinoor, Inc.

Stanley F. Cegelski, general traffic manager, National Can Corp.

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C A S E S T U D Y

DESIGNATION: Strut for jet aircraft engine.

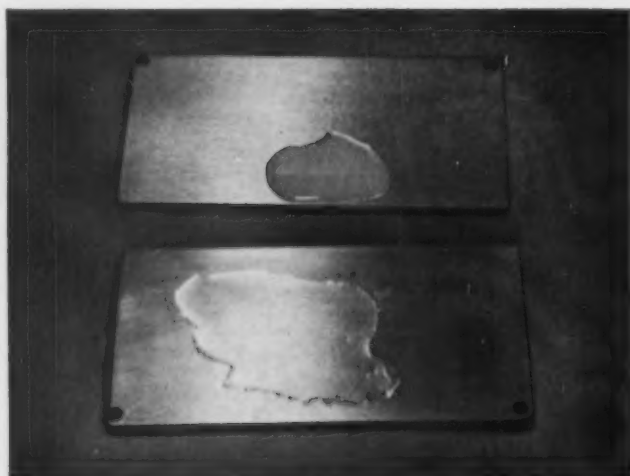
METAL: Timken 1722A Steel.

PARTS: Designed and cast as a single unit.

QUALITY CONTROL: 100% X-ray and magneflux inspected. Chemical and physical affidavits furnished. Test bars submitted.

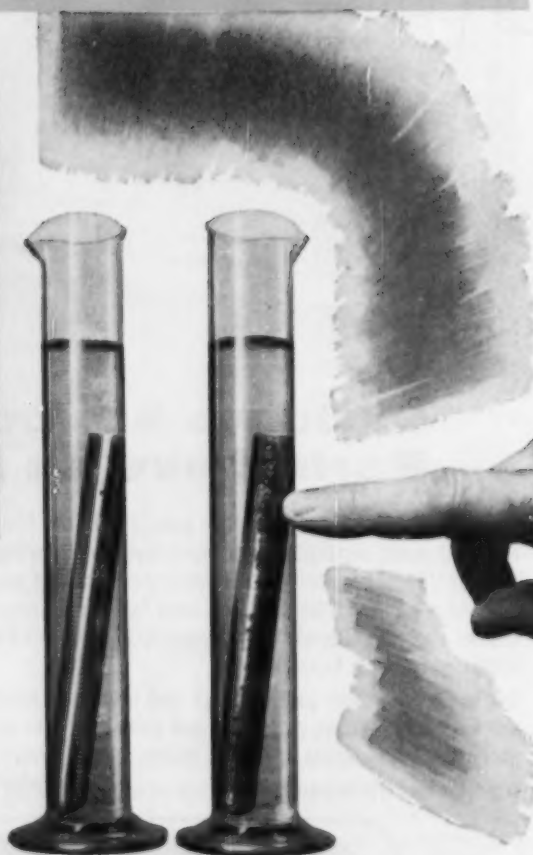
ADVANTAGES: Only the investment casting process could produce this complex part as a single unit, meet the exacting aircraft quality requirements, and reduce the over-all cost to the customer.

Announcing **SHELL DROMUS OIL E**



Above: Cooling action of a cutting fluid is directly related to its wetting ability. Conventional soluble oil emulsion (background) "balls" up. Equal amount of Shell Dromus Oil E spreads out thinly . . . wets far greater area.

Right: Plain carbon steel, if left in water at room temperature for about two hours, will rust as shown. Sample on left was in a 1-30 solution of Shell Dromus Oil E and water for six months without rusting.



SHELL DROMUS OIL E

NEW CUTTING OIL

permits higher speeds

and faster feeds

than ever maintained before

Shell Dromus Oil E, a new solution-type fluid, wets all metal surfaces with extreme rapidity and keeps both work and tools exceptionally cool. These qualities permit an increase of machine speeds and/or feeds far beyond anything allowable with conventional soluble oils.

IT'S MUCH EASIER ON TOOLS

There's much more life in any cutter or abrasive wheel when protected by this new oil. *It stays put* between tool and work. (At a 1-30 dilution, average tool life increase in extended field tests was about 50%.)

IT FIGHTS RUST

Shell Dromus Oil E is readily soluble in hot, cold, soft or hard water, and stable in any concentration. Even at low concentrations, it gives excellent rust protection to all ferrous metals, *including cast iron*.

IT KEEPS WORK COOL

Even at stepped-up production rates, you'll find less heating and better finish wherever this new oil is used.

IT SETTLES OUT FAST

Chips and wheel particles settle out immediately . . . the recirculated fluid is clean and free from contaminating particles. It is *not* sticky or greasy . . . leaves no deposits on machines or work.

IT'S GREAT FOR GRINDING

Grinding wheels remain clean, *even when material retains a film of cutting oil from a previous operation*. Even cast iron can be ground cleanly when Shell Dromus Oil E is used to cool the work.

If all this reads "too good to be true," we suggest that you try Shell Dromus Oil E *on any problem operation you have*. It is that good!

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* **HIGH-SPEED SHEARING,
SIDE TRIMMING
AND SLITTING EQUIPMENT
FOR SHEET AND
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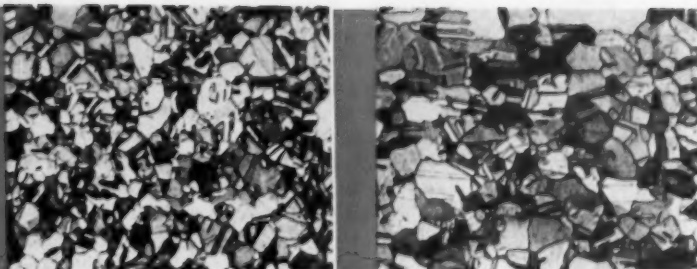
Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

Grain size uniform—

Better Copper Tubing Starts With Accurately Controlled Annealing



MICROGRAPHS show uniform grain structure of deoxidized copper tubing after in-process annealing (left) and final annealing (right). 100X.

♦ Accurate control over annealing cycles will give the grain size uniformity and scale-free surfaces so essential to the drawing qualities of copper tubing . . . This is being achieved with three modern furnaces and an exothermic type atmosphere generator in a 130,000-sq ft installation having production capacity of 12,000 lb per hour.

♦ At the discharge end of the continuous line, tubing is bright and scale-free . . . Any combination of bending and temper qualities can be obtained . . . Final annealing can maintain a minimum grain size of 0.040 mm.

By VICTOR PETERSON, Plant Manager,
Triangle Conduit & Cable Co., Inc., New Brunswick, N. J.



• **COPPER** tubing must be annealed between drawing operations to prevent tearing and uneven wall formation. Even more important is that the annealing operations be done at uniform temperatures to achieve uniformity in grain size, and in a slightly reducing atmosphere to prevent surface oxidation. Control over both of these factors will improve the quality and appearance of finished tubing.

The tube mill at Triangle Conduit & Cable Co., New Brunswick, N. J., has accomplished just that in its 130,000-sq ft installation. The equipment selected to do the job includes three furnaces and an exothermic type generator designed and built by Surface Combustion Corp., Toledo.

Three furnace types used

The first unit is a continuous direct gas-fired screw conveyor furnace for heating billets before piercing. The second furnace, also direct gas fired, has a roller hearth and continuously anneals straight lengths of tubing after initial drawing. For annealing the finished tubing, a radiant tube-heated, controlled-atmosphere roller hearth furnace is used. Finish annealing is done in a prepared gas atmosphere to get the brightest, cleanest possible surface finish.

All three furnaces, which operate on city or manufactured fuel gas with a heating value of 557 Btu per cu ft, are in the production line. Production flow is essentially from "as-received" billets at one end of the mill floor to the final anneal and packaging at the other end. This layout minimizes handling, speeds production and gives the best use of floor space.

Tubing is produced by piercing and drawing, using some of the world's largest single-chain, multiple-tube draw benches with a pull of up to 200,000 lb. Present production involves copper tubing from 1/4 to 4 in. diam for plumbing, heating, gas, steam, oil and for underground service.

Round billets from 3 to 6 in. in diam and

from 52 to 72 in. long are first taken from the receiving area by fork lift truck to the charge end of the screw conveyor type billet heater. The billet feed mechanism consists of two inclined rails long enough to hold about 30 billets of 3 in. diam. The billets are heated to temperatures often as high as 1750°F and discharged by remote control to the rotary piercing mill. An automatic mechanism releases the billets in a controlled sequence.

Billets move perpendicularly to the furnace axis on two cast alloy screws. Burners firing above and below the work on both sides of the furnace heat the billets uniformly. Premix type burners contribute to this heating uniformity and also provide a neutral atmosphere to minimize oxidation.

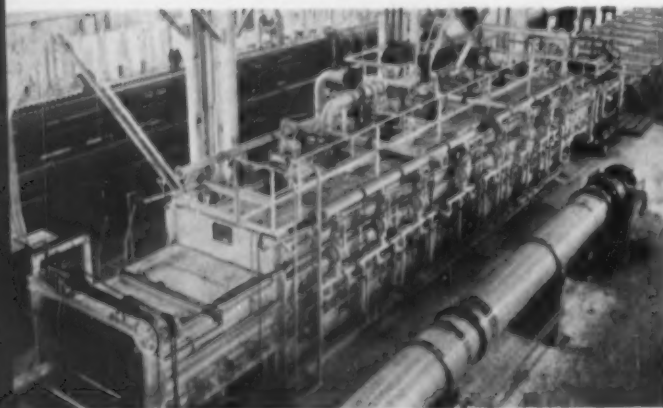
Each billet leaving the furnace turns 90° as it descends on four rails inclined from the furnace hearth level to the piercing mill at floor level. Production capacity ranges up to 14,000 lb of billets per hour.

Uniform heating and minimum surface oxide results in the formation of a very uniform wall thickness in the piercing mill. This is extremely important in subsequent redrawing operations.

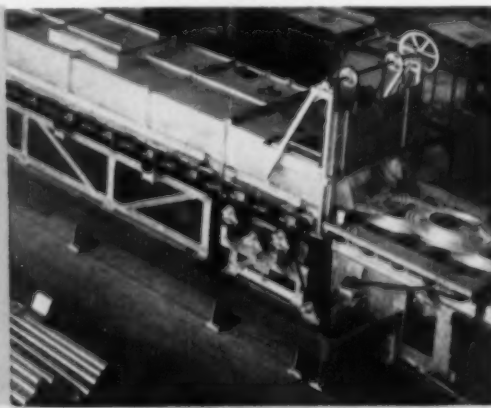
After the pierced tubing has been cut to length, it is put through the in-process annealer where it is annealed for subsequent drawing operations. The number of draws is determined by the size of tube to be produced. Average reduction per draw is about 35 pct.

This continuous type in-process annealer is direct-fired, using premix type gas burners firing above and below the roller hearth level. It consists of a charge vestibule, heating chamber, direct water quench section with over and under water screen seals and a discharge table. Tubing up to 60 ft long can be accommodated. Maximum capacity, based on heating tubing of 0.090-in. wall thickness to 1650°F, is 12,000 lb per hour.

To heat and hold the furnace at temperature, 38 premix gas burners of the pepperbox nozzle



IN-PROCESS annealer can handle tubing up to 60 ft long at the rate of 12,000 lb per hour.



FINAL annealing in this 160-ft unit puts a bright, scale-free finish on the tubing.

type are used. Alloy propeller type fans in the heating section plus automatic temperature control provide extremely uniform heating throughout this chamber. Furnace atmosphere is controlled by regulation of the fuel gas-air ratio of the mixture to the burners.

The quench section employs over and under water screen seals for rapid cooling of the tubes. After cooling, the tubes run out on a reversible transverse conveyor which drops them into a rack on one side of the roller table. When required, the tubing can also be conveyed directly to an adjacent bay.

After the final draw, small diameter tubing is coiled on either the bull block, the automatic coilers, or both. Tubing in lengths is cut and straightened. The tubing is now ready for final annealing.

After heating the tubing to the proper temperature under a protective atmosphere, it passes through three twin-convection cooling zones. Here, the coil temperature is lowered rapidly by recirculation of the protective atmosphere at high velocity over the furnace cooling coils and tubing. By this method, water stains on the finished tubing are eliminated. Length of time in the furnace and cooling sections varies from 40 to 50 minutes, depending on density of the charge.

The roller hearth furnace and cooling section is about 160 ft long. Charge and runout tables increase the length to 200 ft. Its capacity is 12,000 lb per hour when heating tubing or $\frac{3}{8}$ in. diam and 0.065 in. wall to 1400°F.

Contamination curbed

The heating chamber is zoned and equipped with 24 suction type gas-fired alloy radiant tube heating elements, arranged above and below the roller hearth. Since these burners operate with a slight suction in the radiating tube, products of combustion cannot leave the tube to contaminate the furnace atmosphere and damage the work. The furnace atmosphere is maintained at a slight pressure. This pressure, in conjunction with vestibule curtains and adjustable doors, prevents room-air infiltration and reduces loss of furnace atmosphere.

To achieve high uniformity of temperature and the fastest possible heating, particularly at temperatures below 1400°F, six propeller type alloy fans are spaced along the center of the roof arch.

A strip chart records the temperature in the last zone of the heating chamber. Temperature variation is $\pm 10^\circ\text{F}$. The desired grain size is achieved by regulation of temperature and time in the furnace. A minimum grain size of 0.040 mm is achieved easily and regularly.

The prepared atmosphere gas is produced by the exothermic reaction of an automatically proportioned air-gas mixture in a Surface Combustion "DX" atmosphere generator. The composition of this generator gas is usually about

10.5 pct CO_2 , 1.5 pct CO, 1.2 pct H_2 with the remainder N_2 and a trace of water vapor.

Before introducing this gas to the cooling zones, it is cooled by refrigeration to a dew-point of -40°F . When used for purging coiled copper tubing, prior to sealing, it is dehydrated in alumina towers to a lower dewpoint of -40°F . This eliminates all traces of moisture inside the tubing.

The three-zone fast cooling section is connected to the heating chamber by a 4-ft vestibule equipped with water-cooled coils on top, bottom and side walls. Each zone contains two recirculating fans discharging cooled gases over the work from both top and bottom for uniform cooling. Each fan circuit also contains a water coil to remove heat from the system. With cooling water at 85°F , work is discharged from the furnace at about 120°F .

Final anneal brightens work

After passing through the final 30-ft discharge vestibule, the coils of tubing are bright, clean and ready for packaging. To minimize handling and to speed shipments, packaging is carried out on the furnace runout table and on a side discharge gravity conveyor.

Rigid control is required to produce quality copper tubing. Production samples are taken periodically from each of the three furnaces. At the billet heater, incoming stock is checked for analysis and grain structure. Production from the in-process annealer is checked by testing samples from every charge of 100 pieces for analysis, grain size, hardness and when required tensile test strips are pulled.

Close control is also maintained over production from the final annealer by taking stock samples every 2 hours and whenever stock size is changed. The metallurgical laboratory not only makes production tests, but determines whether single or double stack loading will be used during processing in this furnace.

Inspections include repeated dimensional checks throughout production. Before shipment, coils are also pneumatically tested and tubes hydrostatically tested.

Any desirable combination of bending and temper qualities can be produced in tubing with uniform grain size and optimum internal and external surface finish qualities with the equipment now in use.

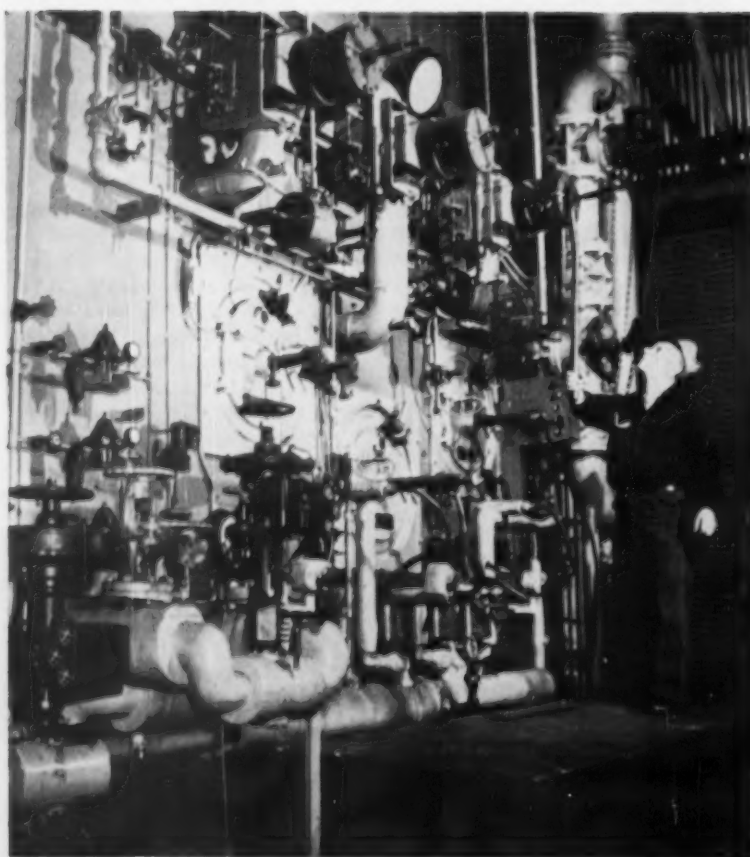
Surface scale is practically negligible. Desired grain size can be attained easily by adjusting the process cycle of any furnace. Final annealing, the most critical, can easily maintain a minimum grain size of 0.040 mm.

Another advantage of the equipment is the efficiency of the adjustable burners which keeps fuel costs at a minimum. Since the gas used is a premium fuel in the geographical area of the plant, this advantage is even more significant. Sizable savings have already been gained through this feature.

Automatic Steam Plant is Waste Fuel-Fired

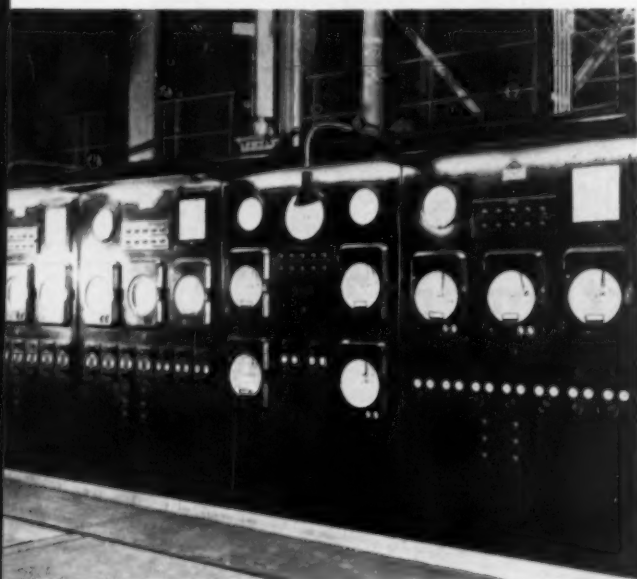
♦ Automatic controls keep Jones & Laughlin's new waste fuel-fired steam plant running smoothly and economically . . . Manual control is required only in case of an emergency.

♦ Major fuel is coke oven gas which was formerly wasted . . . Principal supplementary fuel is residual tar from coke-making process . . . Plant has three 60,000 lb-per hour steam boilers.



ONE of the two operators in the new plant prepares to relight the pilot on No. 3 boiler.

MASTER control panel for all three boilers is constantly observed, can be operated manually.



◆ **EFFICIENCY THROUGH AUTOMATIC** controls and economy through the use of once-wasted fuels are combined to maximum advantage in a new steam generating plant at Jones & Laughlin Steel Corp.'s Pittsburgh Works.

The plant is completely automatic in normal operation, despite extreme variations in both steam demand and fuel supply. Manual control is required only in case of an emergency, such as a failure in some critical component, or a shutdown in the plant's electrical power supply.

As its major fuel, the new facility uses once-wasted gases from the company's Hazelwood Byproducts plant. Previously these gases were either flared-off or bled into the atmosphere. But because byproduct gas output varies widely, the principal supplementary fuel is a residual tar which is an end product of the coke-making process.

Year's test successful

Designed by Jones & Laughlin and the Pittsburgh consulting engineering firm of Peth & Reed, the new plant operated most successfully during its first year of in-service testing.

Overall goal of the design team was to create the best possible waste fuel-fired steam generating facility to meet expanding demands at the Pittsburgh Works. It would have to at least double the previous steam supply and be integrated so that existing boiler capacity could continue to be used at maximum efficiency.

With three 60,000 lb-per-hour boilers, each having a peak capacity of more than 75,000 lb of steam per hour, the new installation more than doubles previous generating capacity of about 160,000 lb of steam per hour.

As a supplementary unit, the new facility provides ample capacity to meet the widely varying steam demands encountered in regular works operations. This includes plenty of spare capacity should one or more of the eight boilers in the old plant suddenly be removed from service.

Automatic sequence controls keep the new plant functioning smoothly and without waste despite fluctuations in the gas fuel supply and in the steam demand. However, manual control will allow continued steam generation should a momentary failure occur in the electricity, air or water supply; in any valve, fuel line, fan or burner; or even in an entire generating unit.

Two-man operation

Whenever any failure or other abnormal condition disrupts the preset automatic sequences, safety interlocks in the control system act to signal an alarm. The two plant operators then take over manually at the control panels until automatic steam generation can be resumed.

The manual control system embodies still another design safeguard. This avoids the necessity for a shutdown if one of the two men in the normal operating crew should suddenly be taken ill, or otherwise incapacitated. If any such accident should occur, the single remaining operator could continue to operate the boilerhouse by himself until he could be relieved. Rugged plant construction plus flexible controls have made the operation of the new facility as foolproof as possible.

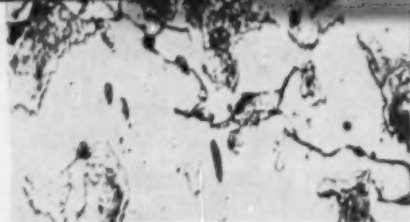
Design pressure of the new plant is 300 psig at about 600°F steam temperature. Plant requirements at present hold the operating pressure down to approximately 195 psig at about 550°F steam temperature. Outside dimensions of the new three-boiler plant are 75 ft square by 40 ft high. Cost of the entire facility, including the associated hot tar supply line, is estimated at \$1,120,000.

Gain additional savings

Precise evaluation of important fuel savings is difficult because the amount of coke oven gas formerly wasted can only be estimated. Additional savings are gained by avoiding equipment shutdowns for lack of a continuous steam supply.

Construction of the new steam plant began with preparation of the ground on June 1, 1953. The first pilot was lit March 1, 1954. Because of its unique combination of automatic controls, flexibility, safety, efficiency and fuel economy had to be thoroughly tested and proven. At the present time, officials are confident there is no possibility of major defects cropping up.

Site of the new steam facility adjoins the ammonium sulphate plant at the Pittsburgh Works, and is within 50 ft of the old boiler house. Fuel supply lines, except for emergency supplies of plant and municipal gas, run from the byproducts plant 900 ft away.



FINE cracks in ferritic matrix near center of 25 pct cold-worked tensile specimen, 5.5 ppm H₂, 100X.

How Important Is Hydrogen Embrittlement?

♦ Hydrogen absorption can permanently affect the ductility of cold-worked steel . . . Gas content does not increase hardness but alters normal fracture pattern . . . Even aging cannot restore ductility appreciably . . . Effect on the hot-rolled material is not as pronounced.

By N. J. GRANT, Assoc. Professor,
and J. L. LUNSFORD, Research Assistant,
Dept. of Metallurgy,
Massachusetts Institute of Technology,
Cambridge, Mass.

♦ A COLD-WORKED mild steel can be embrittled permanently through hydrogen absorption. The hot-rolled product, however, retains ductility when subjected to the same conditions. Fabricators whose product is exposed to possible hydrogen absorption, especially in electroplating or acid dipping applications, should find these results in a recent M. I. T. study significant.

Embrittlement of mild steel (SAE 1020) as a function of hydrogen absorption was achieved by cathodically charging in a 4 pct sulphuric acid solution poisoned with yellow phosphorus. Principally the investigation covered such significant factors as stress-strain testing and quantitative measurements of actual hydrogen content. The times required to achieve a given hydrogen level, the nature of the fractures obtained in testing, and the metallography of the fractured specimens were also considered.

For test purposes, hot rolled 7/16-in. diam. 1020 bar stock was cold worked 25 and 45 pct reduction of area. Tensile test specimens were then machined from the bars, providing each bar with four small knobs at the end of the specimen. The knobs served as samples which could be analyzed for hydrogen content after having been cathodically charged.

It was previously established*, and checked again, that the knobs at the end of the tensile test bar were representative of the hydrogen content in the main body of the test specimen. Cathodic charging was done in a cell similar to

that described in the reference, the anode consisting of a helical coil of platinum surrounding the cathode which was polarized at a current density of approximately 0.5 amp per sq ft.

Tensile bars were charged for periods of time ranging from less than 1/2 minute to more than 17 hours in order to produce desired levels of hydrogen pick-up. Each bar was pulled immediately after charging to prevent the outward diffusion of hydrogen. One of the knobs at the end of the bar was broken off and analyzed for hydrogen content.

Approximate industrial applications

When it was desirable to age-test bars prior to tensile testing, the first knob was used to establish the hydrogen content of the as-charged specimen and the second knob was analyzed at the time the tensile test was made.

The method used in these tests for charging hydrogen into steel probably does not produce uniform distribution throughout the specimen thickness. Also, the short charging times (less than 1/2 minute in some instances) probably produce a more severe hydrogen gradient in the diameter of the specimen than do long charging times. However, since similar practice is commonly approximated in industrial applications, the practical usefulness of the conclusions derived are not materially affected.

For most of the tensile tests a setting of 0.6 on the Vickers strain gage was maintained

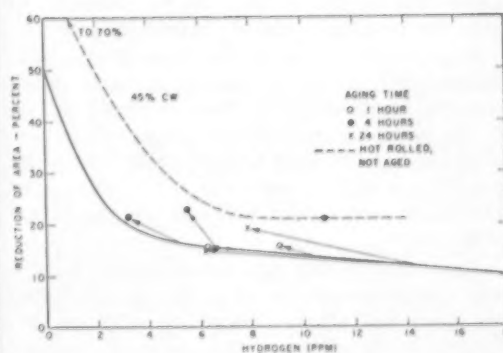
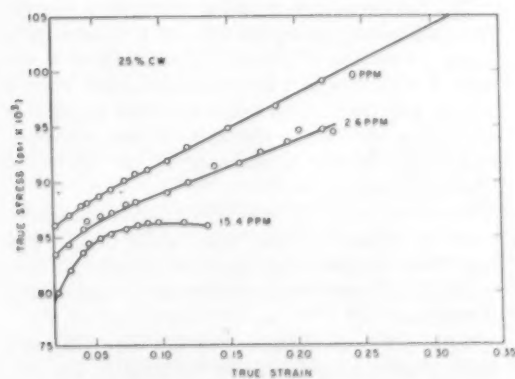
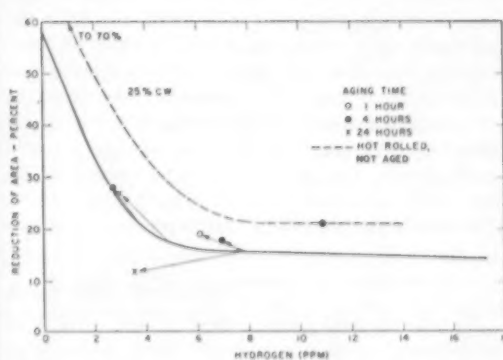
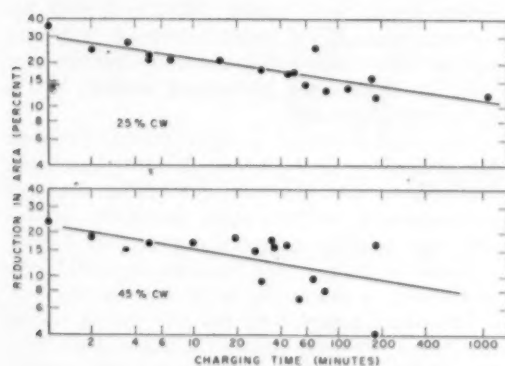
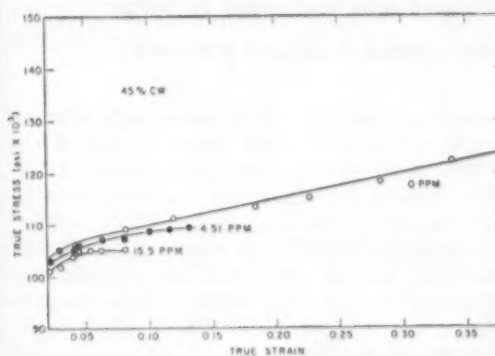
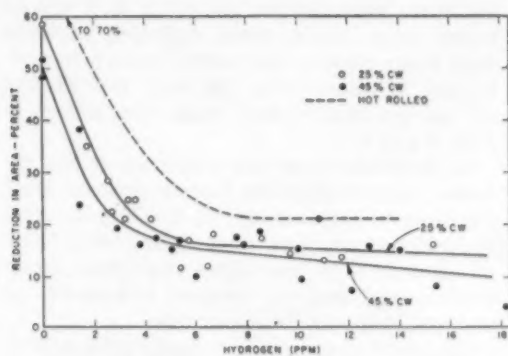


FIG. 1—Reduction in area, per cent, as a function of hydrogen content in 1020 steel.

FIG. 2—Effect of charging time in a sulphuric acid solution on reduction in area.

FIG. 3—Stress-strain relationship in a 25 pct cold-worked steel with varying hydrogen.

FIG. 4—The relation of stress vs. strain in a 45 pct cold-worked steel with 0-15.5 ppm H_2 .

FIG. 5—Effect of aging times on the ductility of 25 pct cold-worked, embrittled steel.

FIG. 6—Ductility as a function of aging times for a 45 pct cold-worked, embrittled steel.

"As little as 2 to 3 ppm of hydrogen was sufficient to alter the normal fracture pattern . . ."

throughout the test. This corresponds approximately to an arc whose secant is 0.0005 (or 0.0005 sec⁻¹) through the elastic region, 0.0015 sec⁻¹ through the transition to plastic behavior, and roughly 0.015 sec⁻¹ in the plastic region. The nature of the fracture was noted, and metallographic studies were made of the specimen cross section and gage length to determine the nature and distribution of cracks which might have formed during the tensile test.

In Fig. 1 is plotted the percent reduction of area versus hydrogen content for the 25 and 45 pct cold-worked steels. Included is the curve from Seabrook et al to show the increased embrittlement due to prior cold work. As with the annealed 1020 steel, the ductility falls off very rapidly, reaching an approximate minimum beyond about 4 ppm of hydrogen. The annealed steel reached a virtual plateau at a minimum of about 20 pct reduction of area. The 25 pct cold work lowers the ductility to approximately 15 pct, with evidence of a continued decrease in ductility with increasing hydrogen out to about 16 ppm.

Effect of cold work

The 45 pct cold-worked steel is more brittle at all levels of hydrogen content. Also, it tends to fall off at a more rapid rate than the 25 pct cold-worked grade at 6 ppm of hydrogen and higher. Despite the scatter of ductility data beyond 6 ppm for the 45 pct cold-worked steel, the ductility falls to values below 10 pct reduction of area for hydrogen contents beyond 12 ppm.

Some of the scatter in reduction of area with increasing hydrogen content is probably linked with the longer charging times as shown in Fig. 2. The scatter is small for the 25 pct cold-worked steel out to a charging time of about 1 hour. Beyond this time, the scatter is more severe. For the 45 pct cold-worked material the results are even worse.

True stress-strain data are plotted in Figs. 3 and 4 for specimens tested in the as-cold-worked condition and others charged to different hydrogen levels. Both charts show a decrease in the yield strength and work hardening index with increasing hydrogen content and increasing strain. The decrease in yield and tensile strength of the hydrogen containing cold-worked steels is unusual in that it is contrary to previous results obtained.

Once the base line of ductility versus hydrogen content was established it remained to determine whether the cold worked structures could recover from any of the induced embrittlement by evolution of hydrogen from the specimen. To accomplish this, specimens were

charged to induce essentially maximum embrittlement. After checking for hydrogen content, specimens were held for periods of 1, 4, and 24 hours, after which times hydrogen contents were again checked and tensile tests performed. Results of these tests for both the 25 and the 45 pct cold-worked steels are shown in Figs. 5 and 6.

In every case there was a decrease in the hydrogen content after the holding periods. Most significantly the recovery of ductility in cold-worked specimens even after aging proved to be so slight as to be considered negligible. In no instance was ductility recovery comparable to that obtained with hot-rolled steel.

Specimens charged to produce maximum embrittlement (more than 8 ppm of hydrogen) were tested at strain rates from 0.01 to 8 sec⁻¹. The results with these cold-worked materials indicated that the ductility remained low over the entire strain range tested. Prior cold work apparently expands the strain rate range in tensile testing over which brittle fractures persist, possibly by introducing permanent damage in the cold-worked structure.

Fractures produced in tests showed interesting structures. In the higher ductility specimens (containing low hydrogen), cracking occurred predominantly on the outer periphery of the specimen. Samples containing more than 6 ppm, however, indicated that cracking occurred predominantly in the center portion of the bar.

The angle assumed by the fine cracks in the specimens were very nearly the angle of the final macro fracture of the specimen. Fine cracks were frequently found in the 25 pct cold-worked material but rarely occurred in the more brittle 45 pct cold-worked material.

The fractures also revealed interesting trends. The cold-worked material free of hydrogen produced a fracture of the typical cup and cone variety, but as little as 2 to 3 ppm of the gas altered the normal fracture to one where the angle was approximately 37° to the axis of the specimen. This angle tended to decrease as the hydrogen content increased.

When the ductility was 20 pct or less, no evidence of isolated cracks was found in the test bar. With partial hydrogen embrittlement, isolated cracks were found primarily in the center of the bar.

Metallographic examination revealed that the fine normal cracks appear to originate in the ferrite. Some of the cracks may begin at the edge of a pearlite colony, but growth again appears to be into the ferrite.

Contrary to what might be expected, hardness measurements failed to show any effect of hydrogen for either the hot-rolled or cold-worked steels.

REFERENCE

- *J. B. Seabrook, N. J. Grant, and D. Carney, "Hydrogen Embrittlement of SAE 1020 Steel," Trans. AIME, Vol. 188, Nov. 1950, p. 1317.

Anodized Coatings: What They Are—How They Behave

Part II

♦ Formation of an anodized coating on aluminum is a complex process . . .
Its interpretation is further complicated by the composition and structure of the aluminum as well as the production of hydrogen in the pores.

♦ Relationships exist between breakdown resistance, anodizing time, coating thickness, current density and sealing of commercially-pure aluminum . . .
By calibrating a particular process, satisfactory determinations can be made of film properties and values.

By C. C. COHN, Director of Research,
Technical Processes Div., Colonial Alloys Co., Philadelphia

♦ **ANODIC COATINGS** on aluminum are substantially aluminum oxide. They are continuous and transparent. The greater the aluminum purity, the more transparent, continuous and protective are the coatings. In commercial practice, the coatings vary from 0.0001 to 0.0006 in. thick or about 100 to 1000 times as thick as naturally formed oxide films.

Oxidation characteristics of an alloy are more or less dependent on the type of micron constituents present as well as the amount, size and distribution of these constituents. Some constituents may remain unchanged in the oxide coating, or they may be anodically attacked and removed completely during the oxidation treatment. Silicon is neither oxidized nor dissolved.

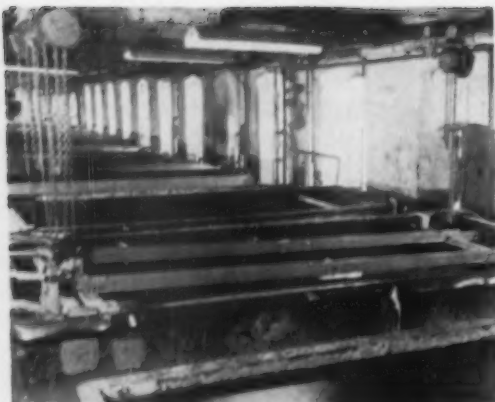
The constituents copper-aluminum (CuAl_2) and aluminum-magnesium are either oxidized or dissolved much more rapidly than the aluminum matrix. When these are present, the

coatings tend to be thin, rough and somewhat porous. Pores which occur in these oxide coatings can be sealed by treatment with chromate or other solutions.

Cracks formed in the oxide layer of aluminum at sharp edges and bends are due mainly to stresses developed during the building up of the oxide layer. In the oxides on thin aluminum wires, longitudinal cracks occur. The heterogeneous structure of the layer contributes to the formation of cracks. If thicker layers must be applied, sharp edges should be avoided. Coatings on concave bends are not subject to cracking.

Surface defects on anodically treated aluminum and its alloy originate either from me-

PART I of this two-part series, which discussed film formation, appearance, electrolytes and other aspects of anodizing, appeared in last week's issue.



QUADRUPPLICATE bus bars accommodate four sets of racks, taking full advantage of tank space.



SEVERAL persons must rack work to keep pace with anodizing which takes only a few minutes.

chanical imperfections or structural characteristics of the metal. Scratches, abrasions, local tearing in rolling, blowholes, cracks and cavities in rolled castings lead to defects of the first type. They are visible before anodic action and can be eliminated before treatment.

Anodic oxidation resembles macroetching, but is more sensitive. It shows grain size, lack of homogeneity through different coloration of adjoining grains, intercrystalline corrosion, and the presence of insufficiently broken down original dendrites. Both rolled and cast articles respond similarly.

Few thickness tests

There are relatively few existing methods for determining the thickness of anodically produced oxide coatings on aluminum. Many are of a destructive nature. On the other hand, within normal thickness limits, the voltage breakdown is a linear function of oxide film thickness. This has been used in developing a test method for determining the thickness of coatings produced under controlled conditions with practically no injury to the finish.

Relationships exist between breakdown resistance, anodizing time, thickness of coating, current density and sealing of anodically oxidized polished commercially-pure aluminum. By calibrating a particular anodic process, satisfactory results may be obtained in a short time, often without marring the article. Since the oxide coating is not entirely homogeneous, many readings must be obtained for every test condition.

This method is now used as a routine test for checking the thicknesses of aluminum oxide coatings. For general work, a rough factor of 93 v per 0.0001 in. has been used. Values are within 10 pct of those obtained with the microscope. Measurements too near the edge, or where the coating has been bent, should be avoided.

Film permeability measurements have been performed on sealed and unsealed anodic films

prepared by complete anodization of 99.5 pct pure aluminum foil in chromic and sulphuric acids, and by solution of aluminum by mercuric chloride after anodization. Four different measuring techniques concern the diffusion rates of salts through the anodic films, the rate of osmosis with the films as a membrane, the rate of transport of water through the film, and the conductance of the films.

Results relative to comparable sections of the same sheet agree within 20 pct. Those relative to sections of different sheets diverge by a factor of 2. Sections isolated by mercuric chloride gave poor reproducibility. However, it was very much improved by sealing the film in place.

The behavior of films produced by complete anodization in sulphuric and chromic acids with respect to potassium chloride and potassium nitrate is very similar. Sealing decreases permeability by a factor of 100. Anodic films are permeable to solute molecules, and molecules as large as sucrose can diffuse through the film.

Equal diffusion rates

The rate of diffusion of potassium chloride and potassium nitrate is equal and proportional to the concentration gradient in the range of 0.1 to 1.0 mil, although their corrosive action is widely different. This proves that the corrosive action of the halide ion is not a result of any special case of penetration of the bulk anodic film. It appears that the film is not entirely penetrated by pores but that a residual, comparatively impervious barrier layer constitutes the main impediment to permeability.

In the mechanism of electrolytic oxidation, an aluminum anode in a density-current circuit is polarized by an anodic oxide film formed by the discharge of oxygen ions on the electrode. Growth of this film depends on the superposition of two opposing phenomena in the electrode: (1) some OH ions have enough energy to pass through the barrier and deposit on the metallic anode oxidizing the aluminum, and (2) there is

an inverse ionization phenomenon, depending on the dissolving power of the bath on the aluminum and the oxidation conditions.

This reaction tends to dissolve the oxide film on the surface, making it porous, but the pores diminish resistance to current. These factors determine the film thickness. Very dense and compact films, but not more than 1μ thick, are obtained with electrolytes with a pH close to 7. These include the bicarbonates, borates, nitrates, phosphates, and alkalies in low concentrations at not very high temperatures. These dense films are used in condensers.

Somewhat porous films of greater thicknesses can be produced in electrolytes which attack aluminum moderately, such as a 20 to 25 pct sulphuric acid. Such films are useful for protection against corrosion, wear resistance and decorative purposes.

Experiments led to the abandonment of the view that anodic coatings on aluminum grow inwardly because of slow chemical solubility of the oxide. It introduces the idea of oxygen efficiency which represents the fraction of electricity passed through an anodizing cell that is responsible for formation of aluminum oxide. The remainder causes either generation of free oxygen or anodic solution of aluminum. This leads to simple algebraic expressions permitting correlation of current density, temperature of electrolyte, and concentrations with this efficiency.

Graphs of measurements show a close parallelism with an abrasion test for evaluating the quality of anodic coating. Subsequent adjustment of the theory to take into consideration chemical solubility of oxide leads to mathematical expressions showing that the oxide coating grows to a maximum thickness. This agrees with experimental results of Mason and Slunder. They also derived an expression for oxide loss by chemical solution which is supported by measurements.

Anodic oxidation causes formation of an an-

hydrous oxide film on aluminum which will check electrolysis if the character of the pores was not formed by attack of the electrolyte. A very violent attack, due particularly to the presence of chlorides, dissolves this film completely and causes the aluminum to deteriorate.

These chlorides are found in the electrolyte, producing a generalized attack, or they are assimilated in the aluminum as a result of either a poor refinement of metal conduit or welds insufficiently freed from their flux by washing, leading to local attacks.

The electrolytic bath must have a chlorine strength of less than 0.4 pct. It is concluded that chlorides greatly disturb the mechanism of anodic oxidation since the very active chlorine ions enter deeply into the oxide film during oxidation. They provoke severe corrosion. The chlorine ions remain in elevated concentrations and produce intense anodic dissolution.

These inclusions can have various origins such as foundry flux, welding flux and bad fluxes after soldering. Use of welding flux containing only fluorides is recommended.

Attack oxidation film

The electrolytic bath itself can contain chlorine ions. When their strength is weak enough, the oxidation film is attacked generally with a lessening of stiffness. If this strength exceeds a limited value, local corrosion appears as in the case of chloride inclusions. The strength of chlorine in the electrolytic baths must therefore be varified regularly.

This effect of chlorides is evident only at normal anodizing temperatures and at conventional current densities. At low electrolyte temperatures and high current densities, chlorides are beneficial to produce thick anodic coatings in a very short time.

Colloidal additions lower surface tension of the solution. Aluminum sulphate increases the resistance, but the addition of nitric acid gives aluminum nitrate which decreases resistance.



HIGH-PRESSURE spray effectively rinses parts after cleaning, anodizing, coloring and setting.



TYPICAL transformer for anodizing includes a voltmeter, ammeter and an overload switch.

"Hardest films are obtained on pure aluminum or aluminum alloys with homogeneous structures . . ."

Copper sulphate impedes anodizing, but if tartaric acid is added a complex copper ion forms which is not harmful.

The color of the hydroxide is a function of its concentration. If colloidal impurities are present in the bath, intensity of color diminishes. Its color is also due to adsorption. Fixing is effected by the polymerization of the alumina after dehydration of the hydroxide.

Four samples of super purity aluminum (99.99 pct), anodized in a sulphuric bath, some sealed, the others not, covered with an oxide film approximate thickness 1μ or 20μ have been studied. The study was carried out by electron and x-ray diffraction.

Experiments have shown that the external layer appears to include monohydrated aluminum (boehmite), anhydrous alumina (gamma oxide) and perhaps a crystalline nonclassical transition form. No difference could be detected between the samples which had been sealed and those which had not. Tests of progressive pickling of thick films seem to indicate that the superficial texture of the oxide does not extend to the deeper layers which are amorphous.

With alternating current, increased current density increases porosity. The colder the bath, less porous is the coating. At low temperature, baths have low conicity and at high temperature they have high conicity. The base of the cone at the orifice of the pore assumes a maximum value when oxidation and solution are equal.

A study was made of film thickness, width of any cracks, and the included angle formed by the walls of such cracks when aluminum alloy components having sharp edges and corners are subjected to anodic oxidation. Cracks in the film generally occur at all sharp bends, and their presence has deleterious effects on corrosion resistance and dielectric strength of the coating. Such faults can be avoided by better article design, especially rounding-off any V-shaped corners.

Porous films are softer

The hardest anodic films attain a reading between seven and nine on Moh's scale; between that of quartz and corundum. More porous films are softer. The hardest films are obtained on pure aluminum or on aluminum alloys with a homogeneous structure. Hardness of the films is not uniform over their thickness. The hardest, and also densest, are the layers adjoining the metal. The outer film layer has the lowest hardness and density.

Tomaschhoff has compared scratch hardness values of aluminum oxide films and those of other materials:

Aluminum (polished surface)	80
Anodic oxide film:	
Surface Zone	140
Middle Zone	3,000
Inner Zone	5,000
Razor steel	1,500
Glass	2,000
Hardest chromium plate	3,100

The hardest anodic films exceed the hardnesses of hardened steel and chromium plate. In wear resistance tests of a lubricated piston alloy in contact with a steel roller, the unanodized alloy suffered considerable wear, some of it smearing onto the steel. An anodized specimen of the alloy showed no measurable wear and did not wear away the steel roller.

In tests without lubrication, anodized specimens again proved superior, suffering less wear, causing much less wear of the steel.

Anodizing of pistons is restricted chiefly to cast silicon-aluminum alloys which anodize more readily and more satisfactorily than the copper-containing alloys. Although the basic method of treatment is well-known, many variations have been suggested for this application.

Patent claims for anodizing aluminum-silicon (about 12 pct Si) alloy pistons for internal-combustion engines calls for suspending them in 13 pct sulphuric acid solution at 21° to 23°C and applying 60-cycle ac initially at 12.5 v for about 3 minutes and finally at 24 v for about 20 minutes to produce a hard protective coating. In contrast to the electrolytic method, it provides much softer and thinner films, capable of retaining oil and possessing limited resiliency in the case of local high stressing.

Oxide film grows

As the oxide film grows in thickness, the thickness of the basic metal must be decreased, but the resultant thickness of metal plus anodic film is often only slightly more. The amount of metal removed is usually less than 0.001 in. This metal is replaced by the more voluminous aluminum oxide, or when sealed, aluminum oxide monohydrate ($\text{Al}_2\text{O}_3 \cdot \text{H}_2\text{O}$). When film efficiency is taken into account, the difference in dimensions is usually negligible.

The limits of impurities for decorative anodizing differ considerably. The best range is 0.5 pct max Fe, 1 pct max Si, 2 pct max Mn, 5 pct max Cu, 7 pct max Mg, and 2 pct max Zn. These figures are for anodic films which have good self color. If color is unimportant, alloys containing as low as 90 pct Al are anodized. In alloys containing more than 1 pct Si, the resultant film has a very poor color and will not dye satisfactorily.

Cams Time Induction Heating Cycles

♦ BY CAM-CONTROLLING their feed rate through an induction heating coil, large quantities of small, short-length steel shafts are differentially case hardened so that both ends remain soft.

These parts are planet gear shafts for Ford, Mercury and Lincoln automatic transmissions produced at Ford Motor Co.'s new Livonia, Mich. plant. They are made from 1085 steel in lengths of 1.8 and 2.67 in., and are ground to 0.4 in. diam. Shaft ends must remain soft so that they can be staked in place; shaft length between the ends must be case hardened to a depth of 0.038-0.053 in.

The case is produced in a hopper-fed heating and quenching setup, using a 20 kw General Electric induction heater operating on 45 kc. The differential heating action is controlled by a novel but simple motor driven cam which moves shafts through the induction coil at a variable rate.

Shafts are fed down a flexible tube from a continuously rotating hopper. As one shaft is ejected from the spiral-shaped cam, the lower end of the next shaft comes to bear on the cam's high point.

The cam is designed so that as soon as one

shaft is ejected, the next falls free for a distance twice the length of the desired soft end. Thus one shaft passes out of the induction coil too rapidly to be hardened at its top end, and the one just entering the coil drops too fast to be hardened at its lower end.

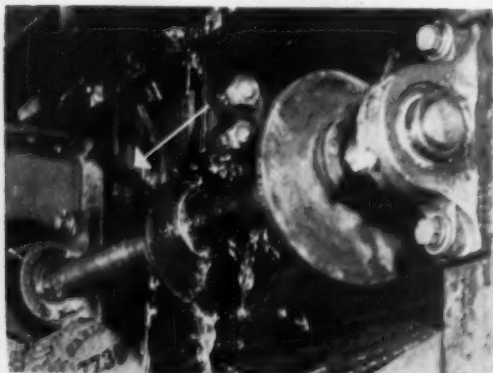
Only the surface layer of the shaft is heated to quenching temperature in this scanning action. Water quenching produces a surface hardness of 64 Rc.

Operates continuously

When a fully hardened and quenched shaft reaches the end of the cam contour, it is propelled onto a chute of wire screening and drops into a tote box for transfer to a draw furnace. In this furnace, case hardness is reduced to 58-62 Rc.

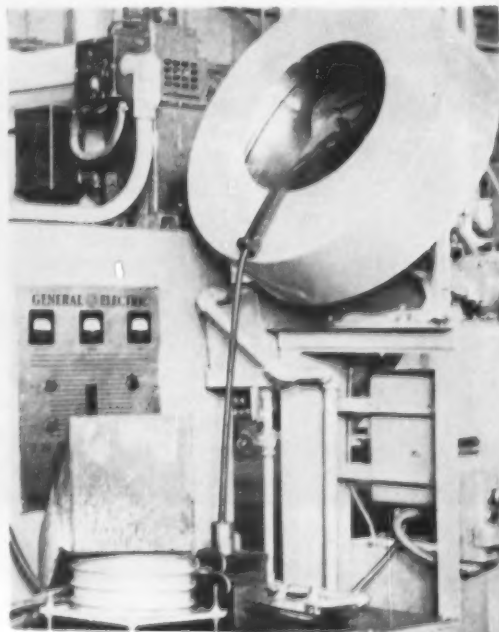
Two cams are needed for the two shaft lengths regularly produced. Shorter shafts are hardened at a rate of 1600 per hour, and the longer ones are processed at a rate of 1200 per hour.

In general, the machine operates continuously and requires little attention beyond keeping the hopper supplied with parts to give a steady flow of work to the induction unit.



Above: CAM at left ejects quenched shaft (arrow). Cam at right is used for a different shaft length.

Right: HOPPER feeds shafts through tube for cam-controlled induction heating and quenching cycle.

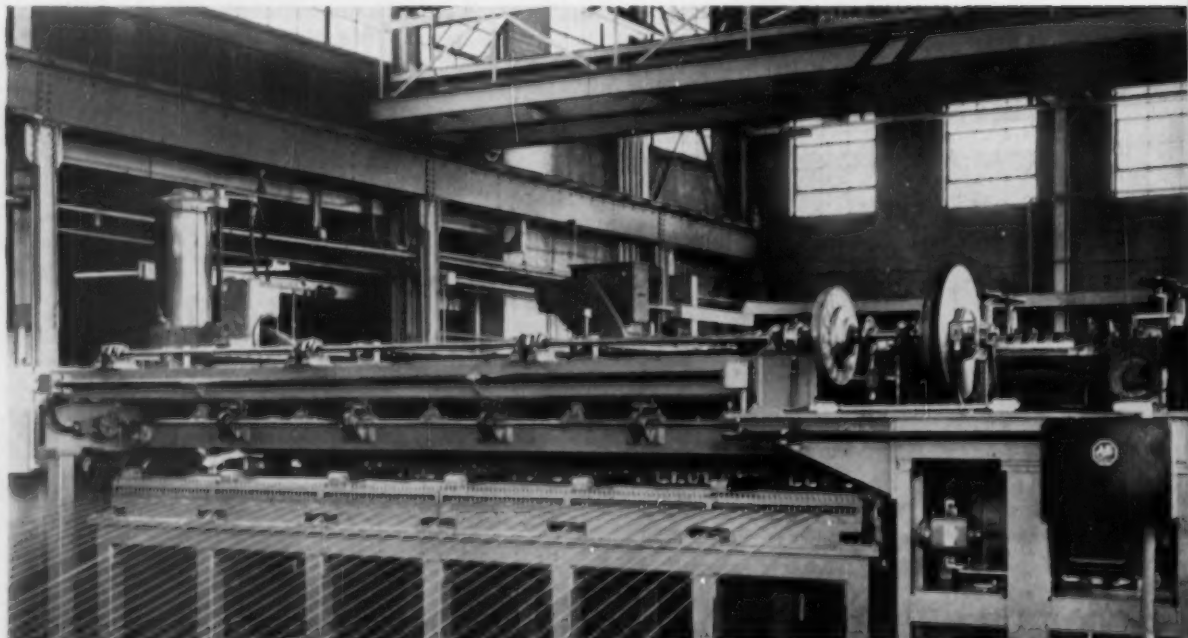


On continuous basis—

♦ A new resistance welding machine produces wire mesh in widths up to 13 ft from continuous coils of 4 to 14-gage wire . . . It welds 60 cross wires a minute to as many as 79 longitudinal wires . . . In spite of its size, this huge machine — occupying 35 by 32 ft of floor space is highly flexible.

New Resistance Welder Fabricates Wide Wire Mesh at High Speed

LONGITUDINAL wires feed into huge machine. In production, wires are fed from large coils.



◆ **HUGE**, but compact; high-speed, yet highly versatile; probably best describes a mechanically operated resistance welding machine which produces wire mesh up to 13 ft wide in a continuous operation. Designed and built by Expert Welding Machine Div., Detroit, the machine and its accessories occupy an area 35 by 32 ft and fabricates mesh from 4 to 14-gage wire at the rate of 60 cross wires per minute.

The machine is extremely flexible. It can handle as many as 79 longitudinal wires with wire spacing from 2 in. up. Permissible spacing of cross wires is from 2 to 12 in. Either square or rectangular mesh patterns can be made.

High-speed operation of the machine is accomplished by feeding six cross wires at a time, cutting them off and conveying them to a hopper. From there, they are fed one at a time to a resistance welding crosshead on which up to 79 individual spring-loaded welding guns are mounted.

The multiple cross wire feed unit is for heavy gages up to $\frac{3}{8}$ in. diam. A single-wire feed is provided for light-gage wire.

The welder consists of five basic units: longitudinal wire straightener, multiple cross wire feed, straightener and cutoff, resistance welding crosshead, a slitter and coiler.

Longitudinal wires in coil form feed through the straightener to the welder crosshead. A single straightened and cut-off cross wire drops over the longitudinal wires and is pulled into

welding position by a set of fingers. The toggle-controlled welding crosshead welds the cross wires to the longitudinal wires. The fingers then pull against the welded cross wire to index the longitudinal wires to the next welding position.

A second set of fingers simultaneously grasps another set of welded cross wires, permitting the longitudinal wires to be pulled through the straightener without deforming any welded cross wires. After welding, the mesh is fed to a slitter where it is cut to desired widths, then directed to a coiler.

The multiple cross wire feed, straightener and cutoff machine takes wire from six individual coils. The wires feed through six individual rotating arbor-type straighteners. When they reach the proper length, all six wires are cut off simultaneously and dropped on a screw-type conveyor which feeds them into the hopper.

Easy to set up

The machine is easily set up and adjusted to suit volume or small quantity production. Its operation is entirely mechanical. One main shaft, driven by a 15-hp motor and speed reducer combination, controls all functions of longitudinal wire indexing, cross wire hopper operation and welder crosshead operation through eccentrics and toggle linkages.

Compactness is achieved in the crosshead by grounding all gun units to a shunting bar. The lower electrodes in the welder are connected to secondary transformer leads so that two series welds are made through two adjacent guns. The guns are individually adjusted transversely.

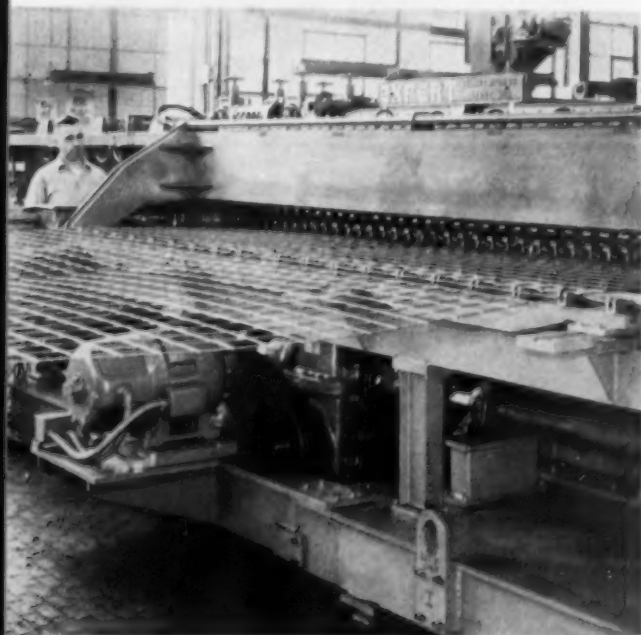
The main shaft operates the welding crosshead through a specially designed inverted toggle mechanism. This provides a long dwell time which contributes to the high operating speed of the machine by making half the crosshead operating cycle available for welding.

The cross wire feed, straightener and cutoff unit has several motor drives. Three 5-hp motors power the arbor-type straighteners, each motor driving two arbors. Two sets of rolls drive each wire, one set ahead of each arbor and one behind it. A 15-hp motor powers all drive rolls.

The cross wire cutoff mechanism is an eccentric and crank type driven by 3-hp motor through an electric clutch and brake unit. A 1-hp motor powers the five screw conveyors which deliver the cut-off wires to the hopper.

The coiler has two 10-in diam mandrels which pilot into each other. Each mandrel is powered by a 5-hp motor and speed-reducer unit. To remove wound coils, each mandrel is retracted axially by a 5-hp motor and lead screw mechanism. A take-up roll controls mandrel motor operation to keep coiling of mesh synchronized with the welding production rate.

FINISHED wire mesh comes off the resistance welder which welds 60 cross wires per minute.



Controlled Surface Finish Reduces Refinishing Time

◆ **TEST FIRING** new and reconditioned howitzers and guns before placing them in service, is one of many tasks performed at the Erie Ordnance Plant in LaCarne, O. Occasionally, this produces galling and scoring on the outside diameters of the gun barrels which then require refinishing.

Surface finish readings on gun tubes to be refinished may run as high as 50 to 60 microinches with additional deep marks from scoring and galling.

To reduce refinishing time and provide an improved surface finish, a Gisholt No. 4 Superfinishing attachment is used. The unit is mounted on an engine lathe of sufficient capacity to handle all sizes of gun tubes.

Finishing operations are performed, among others, on 155 mm howitzer tubes over their entire length. These steel tubes which tend to load and tear easily have a hardness of 36 to 40 RC and a high chrome-nickel content. An improved finish is needed to prevent abrading of the brass from the recoil liners onto the sliding surfaces of the tubes.

Formerly tubes which met drawing requirements still had circumferential tool marks. These were perpendicular to the direction of the recoiling action of the howitzer and tended to impart a filing action to the brass of the recoil liners during the cycle. The Superfinishing operation removed the tool marks or reduced them enough to provide a satisfactory sliding surface.

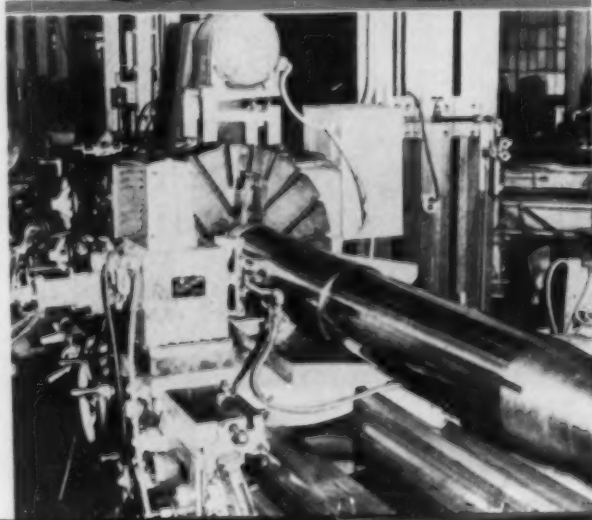
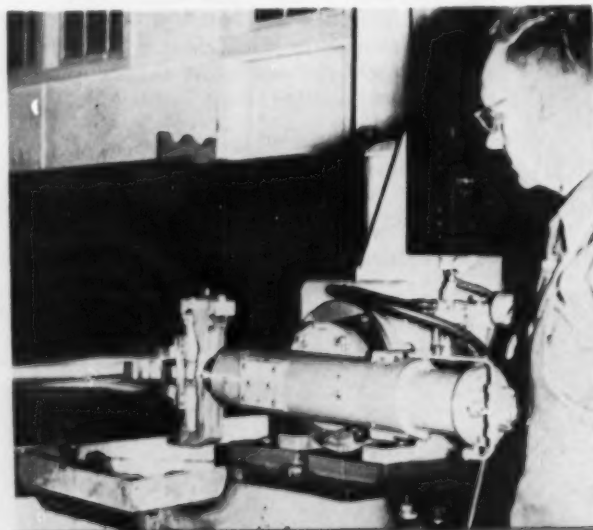
The large diameter of the 155 mm tube is approximately 12½ in. by 64 in. long. The smaller

diameter is about 10 in. and is 64 in. in length. The previous method of finishing required up to two days for a single tube. The Superfinishing attachment makes possible the completion of 15 to 16 tubes in two 8-hr shifts, depending upon surface finish conditions. On the smaller diameter it is necessary to Superfinish over a keyway using a three-stone holder. This workpiece weighs approximately 2900 lb and surface finish requirements are 8 to 12 microinches.

Three finishing operations

There are three separate cycles during Superfinishing. First is a roughing operation in which the work is revolved at 15 rpm at approximately 400 oscillations per minute and a feed of 15 in. per min. The second semifinishing operation runs at 23 rpm with the oscillation rate lowered to approximately 250 per min and the feed remaining at 15 in. per min.

The final finishing operation is done at 37 rpm, oscillation is dropped to 125, and stone pressure reduced from 20 to 10 lb in the final pass, with feed at the rate of 4 in. per min. These production figures are used for the finishing of a gun tube in 1½ hr.



Top—Right: **THREE-STONE** holder is used in this setup to Superfinish 155 mm gun tube over a keyway.

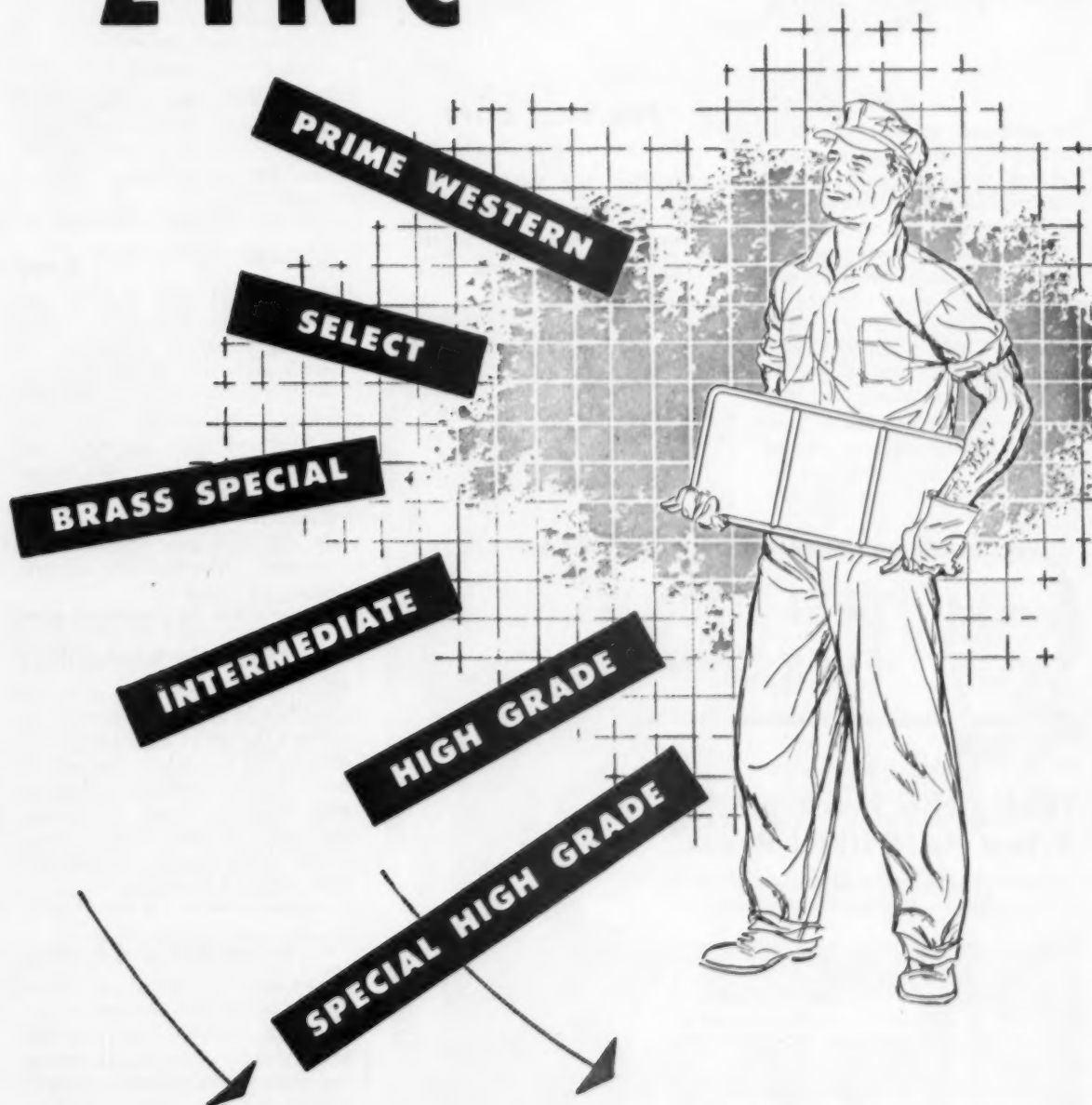
Bottom—Right: **CLOSEUP** of Superfinishing attachment in action.

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for urgent military and

civilian requirements



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AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, O. Chicago St. Louis New York

New Technical Literature:

Catalogs and Bulletins

Die springs

The company's complete line of die springs is contained in a catalog. Medium pressure, medium-high pressure and high pressure die springs are included. A simplified method of spring selection is given in the 16-page book, making it easy to choose the correct size and capacity springs for your specific operation. Tables convert compressed length to free length for the three types of spring, and show load for various degrees of compression. *Danly Machine Specialties, Inc.*

For free copy circle No. 1 on postcard, p. 109.

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 109.

Carbide tools

Featuring, for the first time anywhere, "throw-away" insert blanks, each size in two thicknesses, this new, fully illustrated publication

covers the complete Adamas line of standard tools and standard blanks. This 16-page booklet also contains prices and specifications. *Adamas Carbide Corp.*

For free copy circle No. 2 on postcard, p. 109.

X-ray

An 11-page booklet explains the 250-kv constant potential X-ray for studying internal structure of opaque material. It discusses advantages gained in using constant potential high-voltage circuits as compared with half-wave and self-rectified circuits in industrial X-ray inspection. The single column, the jib crane, 250-kv mobile unit and productograph are discussed. *Westinghouse Electric Corp.*

For free copy circle No. 3 on postcard, p. 109.

Plastic fabrications

Rigid fabrications and pipe are described in an 8-page bulletin. It outlines the use of Type 1 polyvinyl chloride in the fabrication of exhaust systems, process equipment, and processing tanks. Resistance characteristics and physical properties of the plastic are included. *Atlas Mineral Products Co.*

For free copy circle No. 4 on postcard, p. 109.

Inspection and testing

A booklet describing activities which include such services as engineering consultations, research, non-destructive testing, appraisals and assessments, and product certification has been published. Formerly two firms (Charles Warnock and Co., Ltd., and The Hersey Laboratories, Ltd.) they joined forces in 1954 to become the largest independent inspection and testing organization in Canada. *The Warnock Hersey Co., Ltd.*

For free copy circle No. 5 on postcard, p. 109.



**"BEST \$1286 WE
EVER SPENT!"**

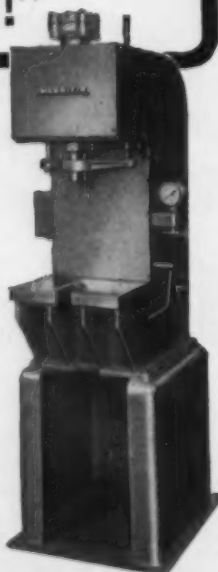
That's the price of this 5-Ton HANNIFIN Press*

A lot of production men have made such comments about this versatile little hydraulic press.

They like the way you can adjust it to the exact force you need for each job, all the way from 1 ton to 5 tons. The backstroke is adjustable, too, so the ram just clears the work on any job. Fast-acting controls. Prompt delivery from stock.

WRITE. Complete information and prices on the Hannifin line of 1- to 10-ton Hydraulic Presses will be sent on request.

*Price complete with motor and starter F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.



HANNIFIN

Hannifin Corporation, 513 S. Wolf Road, Des Plaines, Illinois

FREE TECHNICAL LITERATURE

Shaving machine

The new Red Ring model GCR-12-in. internal rotary gear shaving machine is described. Production advantages, design features and machine operation are given in detail with closeup photos and line drawings. Complete specifications are included for the machine which will shave internal gears from 3 to 12 in. pitch diameter, up to 4 diametral pitch and having face widths up to 2½ in. by either conventional shaving or a new plunge-cut process. *National Broach & Machine Co.*

For free copy circle No. 6 on postcard, p. 109.

Control of variables

A 16-page catalog surveys the scope of Kent products and service in the control of processes. Among the subjects included are: water measurement, steam measurement, air and gas measurement, oil measurement, temperature measurement and conditions measurement. There is also an interesting discussion of automatic process control. *George Kent Ltd.*

For free copy circle No. 7 on postcard, p. 109.

Wet blasting

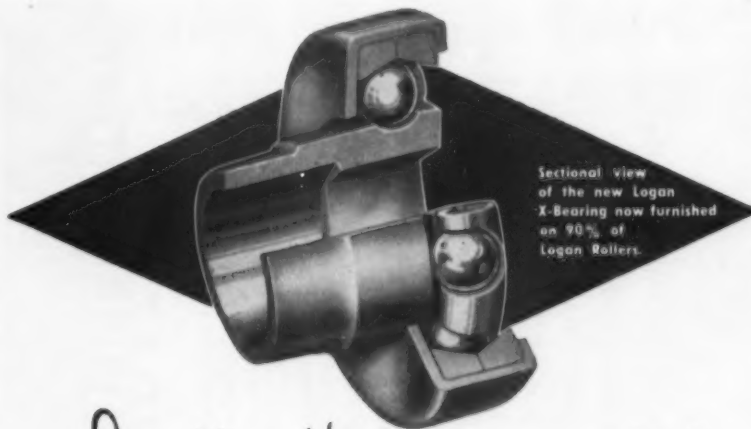
A bulletin has been published entitled "A new source of profits for heat treat shops." It describes the application of the wet blasting process to removing scale from precision work in heat treat shops—work like various tools, plastics molds, and dies for forging, die casting, extruding, cutting, drawing, and forming. *American Wheelabrator & Equipment Corp.*

For free copy circle No. 8 on postcard, p. 109.

Oscillogram processor

The type 23-109 Oscillogram processor is a completely self-contained, motorized unit, designed for daylight operation. It permits "on the spot" processing of paper records to materially reduce the time interval between the taking and interpretation of data. The features of portability and daylight operation are of particular value to test installations. Operating features, specifications and price list are included in the booklet. *Consolidated Engineering Corp.*

For free copy circle No. 9 on postcard, p. 109.

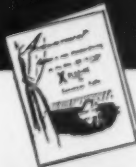


Sectional view of the new Logan X-Bearing now furnished on 90% of Logan Rollers.

Something New has been added
at no increase in price...



Typical installations which include Logan X-Bearings



Write for your copy of
Folder X-1

It costs no more to get conveyors equipped with the Logan X-Bearing... the new low friction, extra quiet bearing, with semi-precision construction. Also, this bearing is interchangeable with old style bearings and will be furnished on replacement orders. Logan is now standardizing on this high efficiency construction. Note: Less grade is required on gravity lines and the manual effort required has been correspondingly reduced on level push lines. Ideal results also obtained on belt and live roller conveyors through the use of X-Bearings. Write for Folder X-1.

**LOGAN CO., 545 CABEL ST.
LOUISVILLE 6, KY.**

Logan Conveyors now
standardizing on the new
X-BEARING



20-FOOT FURNACE ROLLS Centrifugally Cast



... of Duraloy HH Alloy, one of the most widely used high chrome, medium nickel alloys.

Two items concerning these furnace rolls may be of particular interest:

a—the size: 20 feet long—14" OD, $\frac{3}{4}$ " wall thickness

b—welding operations by which reducing cones and shafts (both statically cast of the same alloy) were welded to the centrifugally cast rolls

These two items will serve to emphasize two phases of our service: (1) the large size centrifugally cast tubes we are able to produce and (2) our machining and finishing facilities, including welding.

Our new 16-page general Bulletin — 3354-G — gives complete details. Would you like a copy? When writing or calling would you mind telling us the general nature of your high alloy casting requirements? Better yet, if you have specific requirements on which we could help, let us have the details.

THE DURALOY COMPANY

OFFICE AND PLANT, Scottdale, Pa.
EASTERN OFFICE, 12 East 41st Street, New York 17, N. Y.
DETROIT OFFICE, 2306 Woodward Avenue, Pleasant Ridge, Mich.
CHICAGO OFFICE, 301 South Michigan Ave.

FREE TECHNICAL LITERATURE

Materials handling

A condensed catalog containing 50 pages of technical data, brief description and photographs of vibratory equipment, feeders, conveyors, power tools, shaft seals, diesel pile hammers, gasoline hammers, selenium rectifiers and other materials handling equipment, has been published. Information is included on the complete line of all models of Syntrol equipment. *Syntrol Co.*

For free copy circle No. 10 on postcard, p. 109.

Flowcoat finishing

The process of flowcoating paint materials has been used for many years, but recent engineering advances in equipment and in paint products have resulted in a rebirth and more widespread use of this method of paint application. Topics discussed include: description of the flowcoating process, when to use flowcoating, advantages and limitations of flowcoating, major operating variables, surface preparation, primers, topcoats, etc. *E. I. du Pont de Nemours & Co., Inc.*

For free copy circle No. 11 on postcard, p. 109.

Precision handling

Overhead handling equipment which can provide efficient, precision handling in machining areas of the plant is described. The folder explains how machine operators at a Chicago plant use Tram-beam cranes. The system permits one-man, push-button control of loads weighing as much as 10 tons. *Whiting Corp.*

For free copy circle No. 12 on postcard, p. 109.

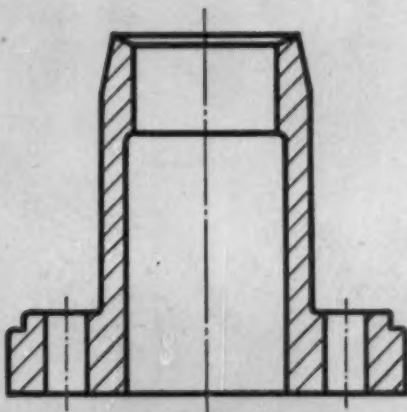
Press brake dies

A comprehensive bulletin covering the complete range of standard Chicago induction hardened press brake dies has been issued. According to the manufacturer, these dies offer longer life than conventional press brake dies at no extra cost. The bulletin makes a handy reference for ordering a wide range of standard dies for production bending of sheet metal and steel plate on press brakes of any make. *Dreis & Krump Manufacturing Co.*

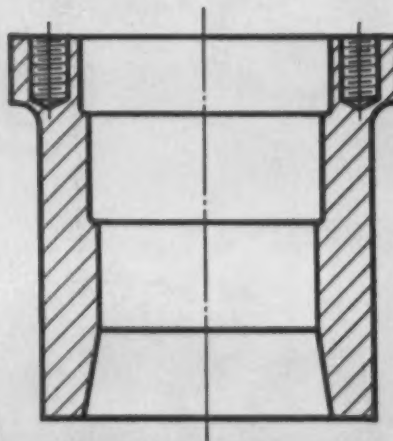
For free copy circle No. 13 on postcard, p. 109.

HOW TO MAKE RING-SHAPED TOOL STEEL PARTS FASTER AND EASIER

FORMING AND PIERCING DIE



BLANKING AND FORMING DIE



Graph-Mo Hollow-Bar comes in sizes from 4 to 16 inches O. D. with various wall thicknesses. Immediate delivery on many sizes from warehouses of the distributors, A. Milne Co. and Peninsular Steel Company.

New GRAPH-MO HOLLOW-BAR® eliminates drilling— and machines 30% faster

YOU can eliminate the time-consuming drilling operation when you make ring-shaped tool steel parts from Graph-Mo Hollow-Bar®. The hole comes ready-made. First step is finish boring. There's less scrap, and you use less steel.

On top of that, the rest of the machining's faster—30% faster, compared to other tool steels. That's because Graph-Mo has free graphite in its structure. It means less tendency to pick up, scuff and gall, too.

That same graphite plus diamond-hard carbides give Graph-Mo amazing wear resistance. Users have written us that Graph-Mo out-wears other tool steels, on the average, three to one!

Graph-Mo responds uniformly to heat treatment. And no other tool steel is as stable. Proof: after 12 years, a typical Graph-Mo steel master plug gage changed less than 10 millionths of an inch in dimension!

More facts about Graph-Mo Hollow-Bar? Write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

June 2, 1955

107



choose **CRUCIBLE COLD ROLLED STEELS**
for finer finish...better edges...closer tolerances



Crucible's complete quality-control during production of cold rolled alloy specialty strip steels means *extra* performance in your shop. And Crucible-patented production equipment makes possible cold rolled steels with finer finish, better edges, greater physical uniformity, and closer tolerances.

At Crucible, the country's leading producer of *special purpose steels*, you'll find a group of metallurgists experienced in cold rolled steels who are ready to help you develop your specification. You'll get the steels you choose fast, too, for Crucible cold rolled stocks are large... both in coils and cut lengths.

So come to Crucible for *all* your cold rolled steel needs. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pennsylvania.*

CRUCIBLE

first name in special purpose steels

Crucible Steel Company of America

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the post card.

This section starts on page 104

Controlarc

The Controlarc dc welder, which automatically and continuously adjusts the selected arc characteristics to every change in welding condition, is described in an interesting folder. Range switches and taps are eliminated. The patented Vickers control has no moving parts, requires no maintenance. Features of the magnetic amplifier rectifier dc welder include: down-draft cooling, weather resistant, rust protected, separate reactor and transformer units, duct cooled transformer, and concentrated weight. *Vickers Electric Div., Vickers Inc.*

For free copy circle No. 14 on postcard, p. 109.

Compounds

A 2-page data sheet lists compounds made by the company for precision finishing of metals, plastics, wood, celluloid, hard rubber, etc. The sheet also describes the company's line of buffing rouges for cut and color on jewelry, sterling or silver plate, precision steel dies, etc. *Russell H. Burns Compound Co.*

For free copy circle No. 15 on postcard, p. 109.

Arc furnace

A new 50-pound vacuum skull-type arc furnace is described. Available with horizontal shell, it is a completely self-contained, versatile furnace for development and small-scale production purposes. This furnace, as well as the complete line of NRC induction, resistance, and arc furnaces, is described in the catalog. *Naresco Equipment Corp., Equipment Sales Subsidiary of National Research Corp.*

For free copy circle No. 16 on postcard, p. 109.

Hydraulic cold saw

New semi-automatic hydraulic cold saws, type WK, are described in an illustrated booklet. Special attention is given to the two-point drive, in which power is transmitted from the six-speed slide gear unit in the saw carriage to the double worm gear drive with righthanded and lefthanded worms. The centralized hydraulic system is diagrammed and explained. *Klingelhofer Machine Tool Co.*

For free copy circle No. 17 on postcard, p. 109.

Membrane filter

A brochure which describes a new type of membrane filter for use in research, production and quality control is available. It gives detailed information on use of the filter in public health surveys, analysis of acid mists, metals fumes and smokes, research in drugs and pharmaceuticals and other areas of application. Filters and apparatus for their use are illustrated and described. Flow pressure charts are included. *Millipore Filter Corp.*

For free copy circle No. 18 on postcard, p. 109.

Roto-Clone

In 1953 a major redesign of the Type N Roto-Clone was completed. Experience with this excellent wet type dust collector since that time has confirmed that the design changes have offered advantages to customers in heavier construction, more sizes, and reduced service requirements. The bulletin contains a complete review of its many attractive features. *American Air Filter Co., Inc.*

For free copy circle No. 19 on postcard, p. 109.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 6/2/55

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Men of Metal

A booklet gives a history of the growth of a metalworking company that parallels the development of the mass production era. James Frederick Wilson, Harry R. Sinclair and Frank E. Billings were all closely connected with the company over its 72 years of service and contributed in many ways to the general development of stamping methods and techniques. This story of the obstacles and achievements in the early days of the industry makes interesting reading. *Worcester Stamped Metal Co.*

For your copy write on your company letterhead to address shown on reply card.

Stainless fasteners

A comprehensive 8-page brochure listing stainless fasteners is just off the press. Included are style and size data about stainless screws, bolts, nuts, washers, rivets, "AN" fasteners, etc. Available body and head styles are illustrated. *All-metal Screw Products Co., Inc.*

For free copy circle No. 20 on postcard, p. 109.

Circuit checker

The Restorer, a device for correcting inaccurate temperature reading and control caused by thermocouple circuit failure during heat treating and melting operations, is described in a catalog. It discusses plant applications, operation of manual and automatic types, pyrometer panel and central control models, and the protection tube leak checker, for warning against incorrect temperature reading and control due to seepage of molten material into thermocouple protection tubes. *Electronics Div., The Peerless Electric Co.*

For free copy circle No. 21 on postcard, p. 109.

Comparator charts

Chart service for optical comparators is described in a brochure. Several typical cases with cost figures are given to show savings possible by using Vanguard services. Also covered are direct-view overlays for casting inspections. *Vanguard Instrument Corp.*

For free copy circle No. 22 on postcard, p. 109.

Servofrax

Servofrax is an economical, sturdy glass which transmits infrared radiation in the 2 to 12.5 micron wavelength band. It is ideal for bolometers, pyrometers, gas analyzers, spectrometers, monochrometers, military projects, as well as temperature control and infrared detection systems. *Servo Corp. of America.*

For free copy circle No. 23 on postcard, p. 109.

Hole finishing burs

Hole finishing with carbide burs was originated by this company as a means of breaking an important bottleneck in the production of defense-vital precision bearings. Far surpassing every other known method, especially where small diameters are involved, it has since been applied with remarkable success to a wide variety of hole finishing jobs on internal grinding machines and jig grinders. *Pratt & Whitney Div., Niles-Bement-Pond Co.*

For free copy circle No. 24 on postcard, p. 109.

Thermocouple assemblies

Illustrated and described is the complete line of Conax thermocouple assemblies and packing glands. This catalog includes for the first time the new thermocouple head, pipe clamp thermocouple, Teflon covered thermocouples, iron constantan and copper constantan thermocouples, etc., as well as the exclusive Conax thermocouple glands, packing glands, change-under-pressure thermocouple glands, and quick disconnect thermocouples. *Conax Corp.*

For free copy circle No. 25 on postcard, p. 109.

Brass

The following products are described in a compact booklet: free-cutting brass, naval brass, manganese bronzes, free-cutting commercial bronze rods, free-cutting 10% nickel silver rod, silicon bronze, forging rods and shapes, brass wire for cold heading of rivets, bolts, nuts, screws, nails, pins, instrument components, etc. Weight tables and specifications are included. *Titan Metal Manufacturing Co.*

For free copy circle No. 26 on postcard, p. 109.

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Village Station
NEW YORK 14, N. Y.

FIRST CLASS
PERMIT NO. 36
(Sec. 369 P.L.R.)
New York, N. Y.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 6/2/55

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How Brainard two-way service cuts strapping costs

Here's Brainard salesman Paul Frank demonstrating proper steel strapping applications to a manufacturer of garage doors. A bulky carton ... but two bands of Brainard steel strapping hold it secure.

STEEL STRAPPING



Photos courtesy Johann and Taylor, Inc., Detroit, Mich.

STRAPPING TAPE

In the same plant, Brainard salesman Frank checks on use of Brainard strapping tape for banding door struts. Strapping tape, applied with a hand dispenser, bands securely and quickly.

● Why does Brainard, a leading name in steel strapping, sell strapping tape too? Because Brainard knows there is a place for *both* methods in most shipping operations. Thus, Brainard can give you *unbiased* recommendations . . . and complete service.

For an unbiased strapping recommendation for every job, call your nearest Brainard office today, or write Brainard Steel Division, Dept. I-6, Griswold Street, Warren, Ohio.



**COMPLETE STRAPPING SYSTEMS & MATERIALS •
WELDED STEEL TUBING • ELECTRO-GALVANIZED STRIP STEEL •
SCAFFOLDING • PALLET RACKS • BUILDING PRODUCTS**

Offices in principal cities throughout the U. S.

HANDLING: Scrap Moved Faster

Conveyor system at Chrysler Plant will move many tons of scrap per day . . . Bales carried to waiting gondolas for removal from plant . . . Conveyors feed automatic baling machines.

Installation of an automatic scrap conveyor system will soon be completed at the Chrysler Corp. Mack Ave. body plant. The equipment is being installed by Commercial Contracting Corp. of Detroit.

To Waiting Car

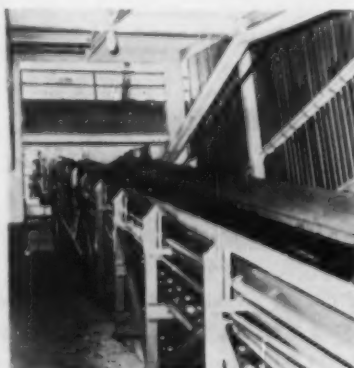
Hinged steel plate components, made by May-Fran Engineering, are used in the system which includes a network of feeder conveyors delivering scrap to two main conveyors, which lead to automatic baling machines.

Each 800-lb bale is moved to waiting gondola cars. A similar system, much larger, totaling 2000 to 3000 ft, is being installed in Chrysler's Nine-Mile body plant near Detroit.

Handles 1000 Tons Per Day

In collaboration with May-Fran engineers, CCC has installed similar scrap conveyor systems in plants of the Fisher Body Div., GMC. They automatically remove, transport, bale and load steel scrap from the big presses at the rate of 800 to 1000 tons per day.

The complete installation will simplify and speed scrap handling.



Speeds scrap removal . . .

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 109. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Packaging:

Carton replacement costs cut through re-use system.

Systematic re-use of cartons for storage and intra-plant transport of electronic subassemblies (as many as 15 to 20 times) has given Martin of Baltimore a substantial savings in carton replacement costs.

It wasn't the wear and tear on the cartons which formerly caused them to be discarded after two or three trips, but the identification numbers which used up all the available surface when scrawled over the sides of the carton, Martin found.

Stenciling a form on the side of the box, with spaces for the identification numbers of 15 or more assemblies, now permits the cartons to be used until they are completely worn out.



Carton re-use system . . .

TOUGHER!

Allen

LEADER POINT CAP SCREWS

Dropping, knocking against metal surfaces and faulty line-up are major causes of damaged threads. Allen's new unthreaded leader point substantially reduces the causes of screw thread injury, or damage to threaded holes. Grip Heads, precision fit sockets that adhere to the key, *plus* the new leader points, make Allens the world's easiest starting cap screws, particularly in inaccessible spots. Sold *only* thru leading Industrial Distributors.



ALLEN

MANUFACTURING COMPANY
Hartford 2, Connecticut, U.S.A.



Ceramics:

Flame spray application gives added metal protection.

A process for coating a wide variety of substances—by feeding powdered ceramic materials through a simple flame gun—has been developed at Armour Research Foundation of Illinois Institute of Technology, Chicago.

Coatings resulting from the process—called Flame Spray Ceramics—are reported to offer greater resistance to heat and chemical stability.

In many cases, the underlying metal actually can be melted without causing coating failure, according to S. W. Bradstreet, supervisor of the chemistry of mineral products in the Foundation's ceramics and minerals research department.

Technique Resembles Metallizing

The technique of application is similar to that required for the metallizing processes. Flame spray ceramics are sintered layers of refractory and chemically inert materials, such as aluminum oxide or zirconium oxide.

The spray coatings do not require that the metal or other base be heated unduly. Ordinary ceramic coatings require heating both metal and ceramic to high temperatures.

Use Stable Metal Oxides

The two basic coatings used—aluminum oxide and zirconium oxide—are stable metal oxides, and do not oxidize further. The alumina coating is harder than tool steel and unusually adherent in thicknesses up to about 10 mils. If applied more heavily, residual stresses may cause coating failure on sudden heating or cooling.

The coating appears to be extremely effective for protecting metals, such as steel and even aluminum, against high temperature erosion such as that encountered in rocket nozzles.

Protects Soft Metals

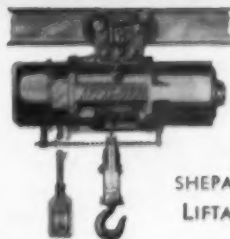
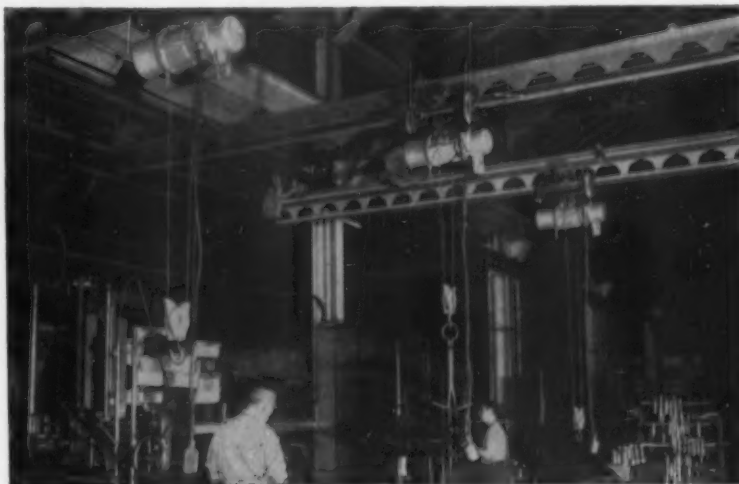
The hardness of the coating suggests its use for protecting soft metals—aluminum, diecast al-

SHEPARD NILES

LIFTABOUT-JR.

PACE SETTER

on your production line



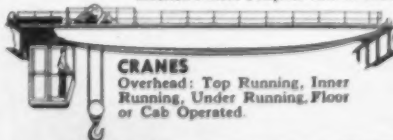
SHEPARD NILES
LIFTABOUT-JR.

Send for Hoist Bulletin today . . . and request a Shepard Niles representative to call. He'll give you the facts on the complete Liftabout-Jr. line . . . help you select the hoist with the right capacity and controls for your lifting job.

MEN AND MACHINES both produce faster when a Liftabout-Jr. carries the load! Manual lifting and lugging are banished . . . the worker puts the load right where it's wanted with ease. Ideal for "spot" handling or for speeding raw materials and products along your production line.

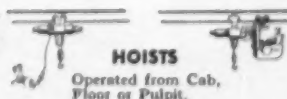
Shepard Niles Liftabout-Jr. is built to withstand years of use and abuse . . . it's the toughest medium-service hoist money can buy. Available with either rope or push button operation . . . parallel or cross-mounted with bolt, hook or trolley suspension in 250, 500, 1000 or 2000 lb. capacities.

America's Most Complete Line of Cranes and Hoists since 1903



CRANES

Overhead, Top Running, Inner Running, Under Running, Floor or Cab Operated.



HOISTS

Operated from Cab, Floor or Pulpit.

SHEPARD NILES

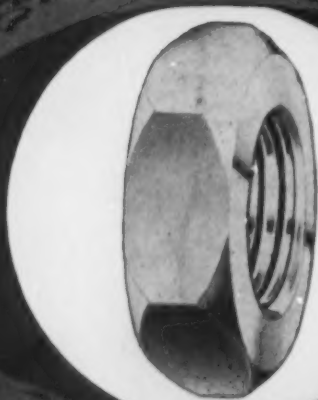
CRANE AND HOIST CORPORATION

1457 Schuyler Ave., Montour Falls, N.Y.

FROM ANY ANGLE

"Fischer Turned"

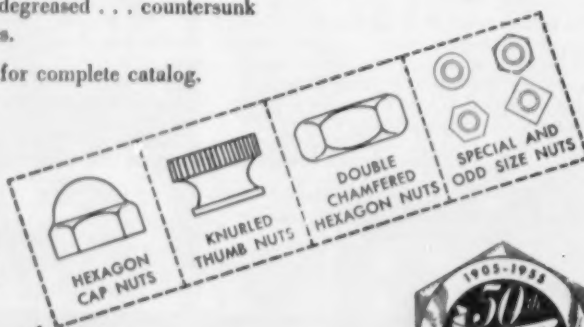
BRASS AND ALUMINUM NUTS



Price, quality, delivery, technical assistance . . . any way you look at it . . . you can count on complete satisfaction if you specify "Fischer Turned" brass and aluminum nuts.

Standard or "specials", Fischer turned nuts cost no more than those produced by other, less accurate methods, yet each is burrless . . . tapped square with the face to Class 2 tolerances . . . cleaned and degreased . . . countersunk on both sides.

Write today for complete catalog.



Fischer SPECIAL MFG. CO.

445 Morgan St. • Cincinnati 6, Ohio



C-234-PS

Additives to the two basic coatings improve protective action of the ceramics . . .

loys, or mild steel, for instance—against erosion and abrasion in pump impellers and housings, fan blades and turbines, and piping subject to cavitation.

Has Insulating Properties

The alumina coating is electrically insulative and use in the manufacture of high-temperature process equipment is anticipated. The coating is poorly wetted by certain molten metals, and preliminary tests show it to act as a satisfactory permanent mold coating for aluminum casting.

The zirconia coating is more refractory and inert than alumina. Although somewhat softer and more difficult to apply, it has excellent resistance to corrosion and heat.

Has Many Uses

The coating will find use in rockets, flame ducts, burner equipment, and as a liner for troughs, feeders, molds, and other foundry equipment, it is predicted.

Flame sprayed coatings have a residual porosity of about 10 to 15 pct and alone do not provide perfect protection against chemical corrosion of the underlying material.

Protection Improved

However, various additives to the two basic coatings improve their protective action, and this can be improved further by overcoating with recent ARF-developed solution ceramics or by co-spraying with soft metals.

Continental Coatings Corp. of Illinois, 2333 S. Michigan ave., Chicago 16, has signed a license agreement with the Foundation in the service contract applicator field for use of ARF patents in the development. The agreement gives Continental Coatings the right to sub-license other organizations throughout the country in the contract applicator field.

TECHNICAL BRIEFS

Testing:

**Handling device passes
million cycle mark.**

In an endurance test performed on a specially-designed testing machine, a new jaw assembly for the Sahlin Iron Hand press unloader has successfully completed more than one million gripping and removing cycles, reports its inventor, Henry Sahlin, founder of Sahlin Engineering Co., Inc., Birmingham, Mich.

"This new jaw," said Mr. Sahlin, "was primarily developed for the automatic unloading of automobile roofs, quarter panels, floor pans and similar large stampings. Its jaw opening has been increased to three inches and the cylinder bore and general construction have been similarly 'beefed-up' to handle the heavier work."

In addition to this jaw, Sahlin has developed ten other types of jaws to handle specialized press unloading problems. The jaws are tested in the machine, which can be adjusted to simulate actual operating conditions.



Million cycles plus . . .

Librarians to Meet

The annual convention of the Special Libraries Assn. will be held June 12 to 17 at the Hotel Statler, Detroit, Mich. Of special interest to librarians in the metal-working industry will be sessions of the Metal Div., June 14, featuring discussions of "Library Procedures," and "New Horizons in Metals and Their Use."

HOW MANY OPERATIONS

WHEN YOU PREPARE

STEEL FOR PAINTING?

Operations	
Cleaning	1
Rinsing	1
Pickling	1
Rinsing	1
Conditioning	1
Rinsing	1
Drying	1
Total	3

What's wrong with that addition? How can seven operations add up to three operations?

It's easy when you use Oakite Compound No. 33 (or Oakite Compound No. 31) to remove rust or heat scale *at the same time that it removes oil at the same time that it prepares steel (or aluminum) for the lasting adhesion of paint.*

That combines cleaning, pickling and paint conditioning into one operation. After rinsing and drying, you have saved the time, the tanks, the space and the solutions for four operations.

O. C. No. 33 is great for removing heavy soil in tanks or for cleaning by hand. O. C. No. 31 is very economical for removing moderate soil in tanks. Each compound is able to strip certain types of paint.

FREE For booklets describing the specific advantages and applications of Oakite Compounds Nos. 31 and 33, just mail the coupon.

Technical Service Representatives in
Principal Cities of U. S. and Canada

SPECIALIZED INDUSTRIAL CLEANING
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MATERIALS • METHODS • SERVICE

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Send me your **FREE** booklets on Oakite Compounds Nos. 31 and 33. I am especially interested in removing the following soils from () steel, () cast iron, () sheet aluminum, () aluminum castings:

- | | | |
|--|--------------------------------------|---|
| <input type="checkbox"/> Oil and grease | <input type="checkbox"/> Carbon smut | <input type="checkbox"/> Tarnish |
| <input type="checkbox"/> Drawing compounds | <input type="checkbox"/> Paint | <input type="checkbox"/> Welding flux |
| <input type="checkbox"/> Rust preventives | <input type="checkbox"/> Rust | <input type="checkbox"/> Soldering flux |
| <input type="checkbox"/> Identification inks | <input type="checkbox"/> Heat scale | <input type="checkbox"/> |

NAME _____

COMPANY _____

ADDRESS _____

New metal
cleaner -
removes
oil and rust
in one
operation

Metal
Cleaner
for Low Cost
Prepaint
Treatment

STEEL: Light Panels Simplify Construction

Costs and time saved in plant building, maintenance through use of light gage steel panels . . . Permanent long-span form designed for use in acoustic and lighting work speeds plant building.

Light-gage steel panels combining the functions of pan forms, acoustic treatment and fluorescent lighting troffers have been integrated into reinforced concrete construction to produce a new system of reducing costs and saving time in conventional concrete work.

Key to the new system, called TAC (Troffer-Acoustic), is in the troffer and acoustical panels. The panels provide permanent long-span forms for concrete joist construction and immediate availability of an acoustically-treated ceiling with recessed lighting troffers.

The panels, each 24 in. wide, are designed for long-span. The acoustical panel is perforated and backed-up with a noncombustible acoustical element to insure a high acoustical rating. The troffer panel provides a housing for minimum-cost fluorescent fixtures and plastic diffusers for recessed lighting and flush ceiling.

As forms for concrete the TAC panels need supporting at mid-span and ends only. Much of the materials, cost and labor formerly necessary for forming and shoring are eliminated. The panels carry no building loads after concrete is cured and fire-resistance ratings

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 109. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

are based on the reinforced concrete structural system.

When concrete is cured only paint, finished flooring and fluorescent fixtures need be applied to complete installation of the TAC panels.

The ceilings can be washed or repainted as often as necessary without affecting acoustical treatment. Lighting fixtures installed in the troffer panel eliminate hanging fixtures and exposed wiring conduits.

Long-span design of the TAC panels makes possible quick erection. Use of the panels permits the structural floor for the rooms above and the acoustical ceiling and lighting system for the rooms below to be completed at the same time.

Perforations perplexing you?

MASONRY? PLASTIC?
METALS? RUBBER?



If you have a design problem that's got you down maybe Hendrick can be of help. Sometimes the easiest and quickest way to enhance a product's beauty is to include a pleasing pattern of perforations in its design. Hendrick perforated metal not only helps increase a product's overall attractiveness, but also adds to its saleability as well. And whatever material you're using . . . whether its metal, masonite, rubber, plastic, hard or insulated board for decorative display or fabricating purposes, you can draw on Hendrick's long experience and perforating facilities to fill the bill. Write for details.

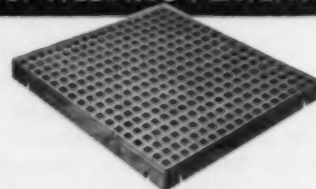
...better call HENDRICK

Hendrick
MANUFACTURING COMPANY



37 DUNDUFF STREET, CARBONDALE, PA. Sales Offices in Principal Cities
Perforated Metal • Perforated Metal Screens • Wedge-Slot and Wedge Wire
Architectural Grilles • Misco Open Steel Flooring • Shur-Site Treads • Armorgrids

BENDING BLOCKS or WELDING PLATENS



5 ft. by 5 ft. by 5½ in. cast steel blocks for layout, welding and assembly. Write today for information. Other sizes, tools, stands & accessories.

ACORN IRON & SUPPLY CO.
Delaware Ave. & Poplar St. Philadelphia 23, Pa.

MATERIALS ROUNDUP

Lubricant:

Impregnation helps solve maintenance problem.

Biggest single problem of the conveyor industry is lubrication maintenance. U. S. Engineering Co., Detroit, believes its new L-458 Keystone heat treated rivetless forged conveyor chain may offer a solution to this problem.

The chain conforms to specifications and dimensions of other similar chains except that it is manufactured with a lubricant impregnated (Useco-Lube) pin and the bearing surfaces of the links are machined.

Friction Reduced

Friction is reduced 75 pct compared to dry steel running against dry steel. The impregnated pin has a smooth dry surface. The chain, which has an ultimate strength upwards of 53,000 psi, has operated in temperatures of -30° to 2000° F. The chain is being used by several of the large automobile companies and foundries.

Paints:

Combine aluminum, strontium chromate as base.

A new rust-inhibitive aluminum pigment has been developed by Reynolds Metals Co. of Louisville, Ky. The company will soon market this new product in the form of a paste made up of strontium chromate and powdered aluminum.

Aluminum pigment offers excellent hiding power, reflectivity, and protection to underlying material. However, it has no rust-inhibitive properties.

Strontium chromate, on the other hand, possesses outstanding rust-inhibitive properties, especially where salt water exposure is involved. The new pigment combines the good characteristics of both pigments.

Test panels painted with one coat of rust inhibitive paste (aluminum strontium chromate) at $2\frac{3}{4}$ lb per gal in standard varnish vehicle V-251 showed excellent resistance to corrosion.

CM Lodestar



**ENTIRELY NEW
differently NEW**

FEATURING:

- Push Button Control
- Self-Adjusting Heavy Duty Brake
- Sealed-in Lifetime Lubrication
- Overload Protection
- Full Enclosed Components
- Lowest Headroom
- "CM-Alloy" Flexible Link Chain

CAPACITIES: from $\frac{1}{4}$ to 1 ton.
Single and 3 phase. $\frac{1}{4}$ ton model weighs only 51 pounds.

**\$149.50
and up**

Built to serve you without costly maintenance



Lodestar is the first truly "heavy duty" version of the small electric hoist. The CM Lodestar is designed to operate without costly maintenance or interruptions in your work schedules. The initial cost is practically your only cost with a Lodestar... an extremely low cost indeed!

WRITE US or call your CM distributor for literature, prices and quick delivery from stock.

CHISHOLM-MOORE HOIST DIVISION

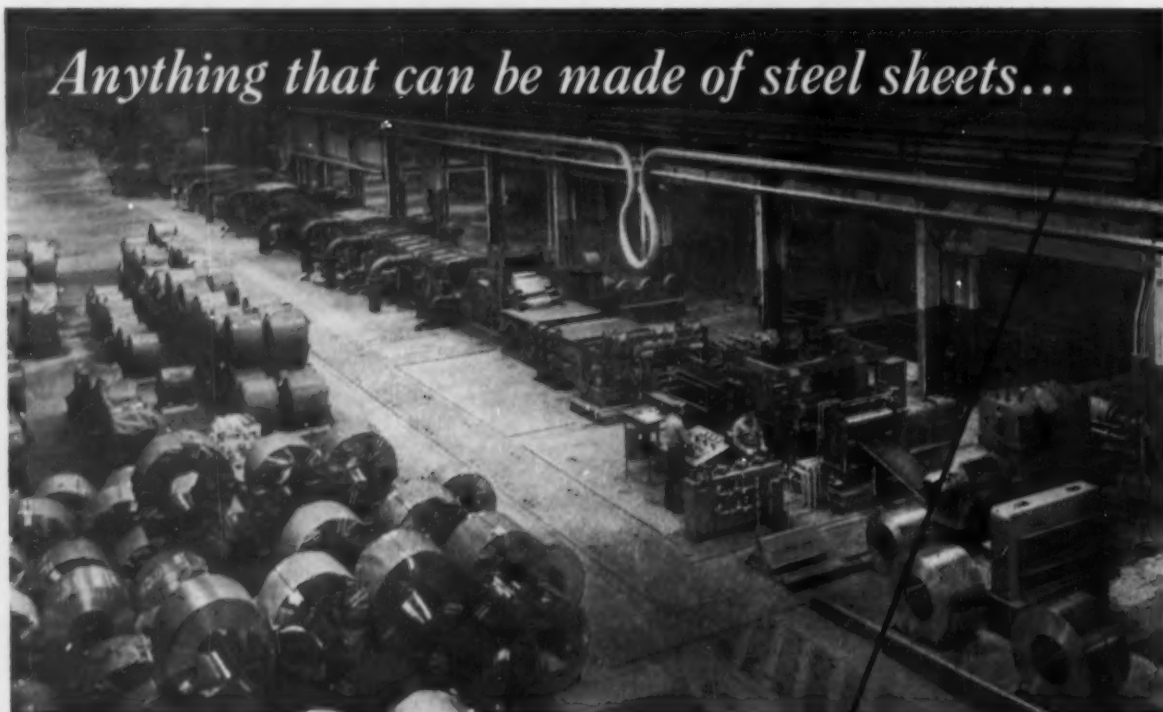
Columbus McKinnon Chain Corporation
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A CHALLENGE!

THE STRONGEST MADE BY ANY GALVANIZED SHEET:



Anything that can be made of steel sheets...

You are looking in on a miracle of modern engineering... Wheeling's new continuous galvanizing line, built at a cost of over \$3,000,000.

The end result is **sofTITE**, the galvanized sheet with the tightest zinc coating yet produced... so tight it won't flake or chip no matter what you do to it. So tight, you can use Wheeling **sofTITE** to make anything that can be made of steel sheets.

That's **sofTITE**... Wheeling **sofTITE**... made by the company that led with the development of **COP-R-LOY**, the original copper-bearing steel pipe, then perfected **DUCTILLITE**, the original cold reduced tin plate which revolutionized the tin plate industry, and opened new fields to the can maker and packer. Now, **sofTITE**... acclaimed the best galvanized sheet yet produced—so good, in fact, that because of the unprecedented demand, Wheeling has been forced to triple its production facilities in 1955. **sofTITE**, a product of Wheeling Steel Corporation, Wheeling, West Virginia.

...can be made of

**WHEELING
sofTITE**

galvanized sheets



IT'S WHEELING STEEL

DISTRICT SALES OFFICES—Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Houston, New York, Philadelphia, St. Louis, San Francisco, Wheeling

FIRST CAME **COP-R-LOY**. THEN *Ductillite*. NOW WHEELING **sofTITE**

NEW EQUIPMENT

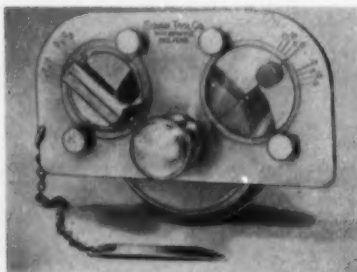
New and improved production ideas, equipment, services and methods described here offer production economies... for more data use the free postcard on page 109 or 110

Lifting device operates on vacuum principle

Steel plates, large castings, sheet rock, etc., can be handled with a new vacuum lifting device. Large vacuum pads grip the materials lifting them safely and securely to their destination. Vac-U-Lift units will lift any object with a non-porous surface that is large enough to allow the vacuum pads to attach

themselves. Lifting power is governed by diameter of the particular pad. It is stated the units can handle weights up to several tons with an ample safety factor. Small hand models and units with curved vacuum pads are also available. *Blake-slee Mfg. Co.*

For more data circle No. 27 on postcard, p. 109.



Cutting edge gage for circular form tools

Checking and sharpening of circular form tools used on automatic screw machines is simplified with the use of a new high precision gage. It permits scribing of the exact cutting edge required on the tool, with or without top rake, and visual checking of the results after sharpening. Conversely, where a

particular cutting angle has been established through experimentation, it can be measured and consistently reproduced thereafter. Operation is so simple that inexperienced men can accurately and quickly sharpen and check form tools. *Somma Tool Co., Inc.*

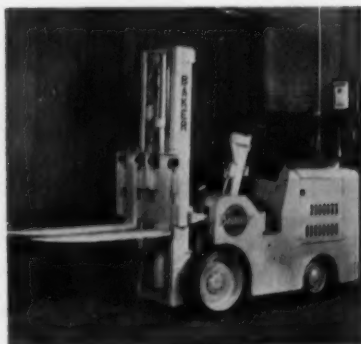
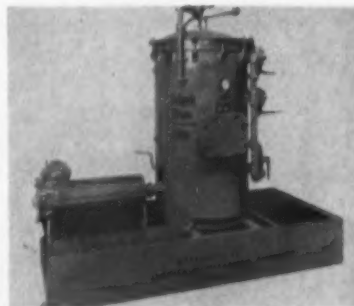
For more data circle No. 28 on postcard, p. 109.

Earth filter is automatic and self-cleaning

The Delpark-Olson superflow filter uses diatomaceous earth with tubular filter elements. Screen elements are precoated with diatomaceous earth forming a filter cake through which the fluid passes. Diatomaceous earth does not affect additives present in most oils and processing fluids. Cleaning is automatic and is accomplished in 1 to 3 min by back

washing. All operations are simple. The cleaning-out process is done without emptying the filter and is fast, clean and easy. The unit is particularly applicable to coolants, cutting oils, test stand oils, hydraulic oils, industrial cleaning solvents and chemicals. *Industrial Filtration Co.*

For more data circle No. 29 on postcard, p. 109.



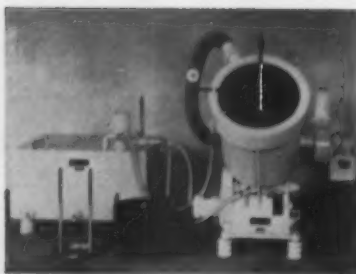
3000-lb truck added to Gas-O-Matic line

Like larger trucks in the Gas-O-Matic line, the Model FD-30 utilizes the Baker-Raulang variable voltage generator integral with a gasoline engine. This is said to give the performance of a gas engine truck with the economy of an electric truck, eliminating the clutch and transmission with their maintenance and replacement problems. Gear shifting is also eliminated. The truck features a foot-pedal-

operated electrical inching control which permits high speed hoisting at low travel speeds. Travel speed is regulated by an accelerator pedal. Power unit is a Hercules heavy-duty 4-cylinder industrial engine. Maximum travel speed with full load is 8 mph. Full-load lifting speed is 40 fpm. Total lift height is 130 in. *Baker-Raulang Co.*

For more data circle No. 30 on postcard, p. 109.

Turn Page



Produces 85 lb of chrome plated parts per hour

A barrel-type chrome plating machine does away with racks or fixtures in the plating of small parts. The Riedel makes it possible to plate small screws and nuts as well as precision instrument, optical, camera and similar parts by simply dumping them into the basket and processing them for about 10 min.

A uniform bright or dull chrome plate may be obtained without the need for hanging the parts on racks or jigs. Three general types of platers include: Economy, of 1¼ gal capacity; Standard, 10½ gal; Automatic, 13 gal, producing 85 lb of parts per hr. *Dawson Corp.*

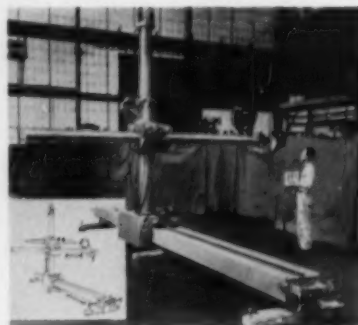
For more data circle No. 31 on postcard, p. 109.

Welding fixture features 3-directional operation

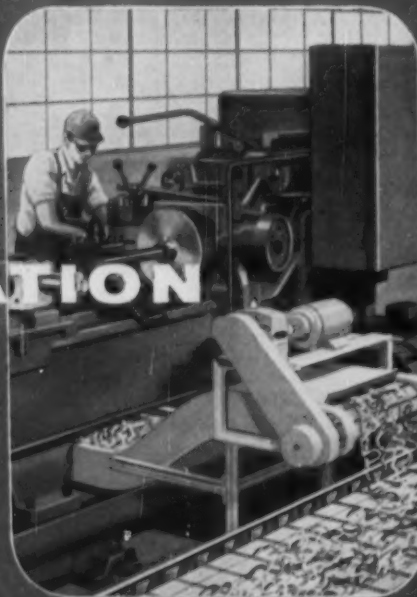
A wide variety of weldments can be handled on a new universal fixture. Features include full portability, simultaneous 3-directional travel, 360° boom rotation and an adjustable base. Any standard head can be utilized for automatic welding, flame cutting or hardening operations. Adjustable base is said to reduce setup time, particularly for large weldments, as much as 60 pct.

Precise alignment for longitudinal and transverse welds is accomplished rapidly and easily by an adjusting wheel at one end of base. Once setup is completed, unit is operated by remote pushbutton controls. Speed of operation is infinitely variable and ranges to 72 in. of travel per min. *Lewis Welding & Engineering Corp.*

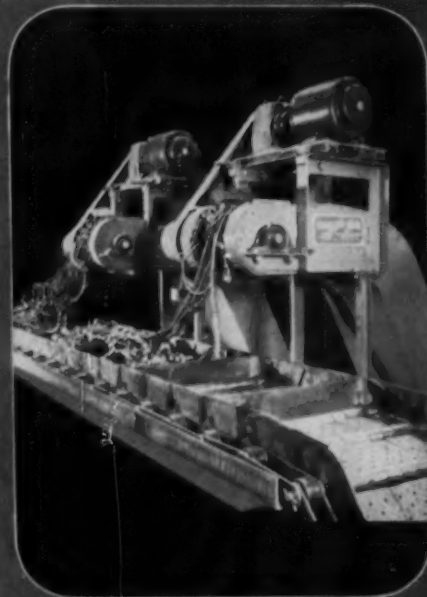
For more data circle No. 32 on postcard, p. 109.



May-Fran
... first
for
AUTOMATION
in
scrap
handling
systems



The CHIP-TOTE conveyor permits complete utilization of machine tools by eliminating shut-down for manual scrap removal.



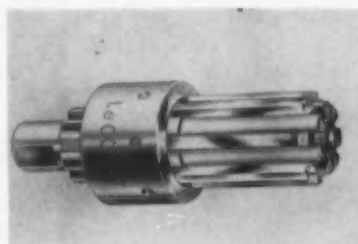
It handles a continuous flow of hot, wet or dry chips, turnings and borings from any multiple spindle automatic machine.

Special mandrels for unusual bore shapes

Production problems encountered with unusual internal bore shapes are readily solved with special mandrels. Two such tools recently produced are a seven-jaw mandrel and a four-jaw mandrel. Both are for precision production work with guaranteed concentricity of 0.0002

in. T.I.R. Both of these specials incorporate Le Count's expanding and hand manipulation features. The latter feature saves handling time in production finish operations by eliminating the needs for an arbor press. *Le Count Tool Works, Inc.*

For more data circle No. 33 on postcard, p. 109.



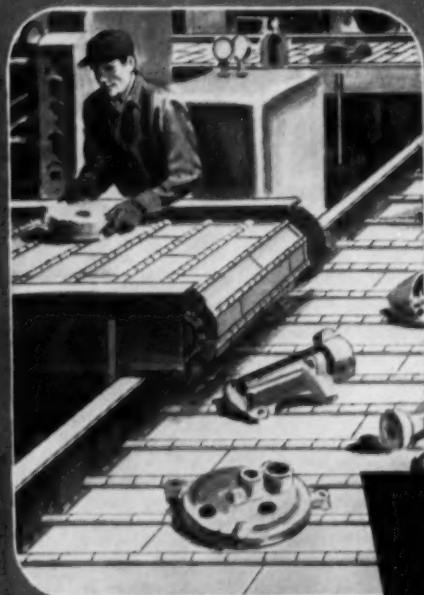
Improved design of do-it-yourself framing material

Dexion 225-80 slotted angle measures $2\frac{1}{4} \times 1\frac{1}{2} \times 0.080$ in. It is manufactured from cold rolled steel with an electro-galvanized finish. Every slot and hole is precision-engineered for quick, easy bolting. In addition to lengthwise slots, the new angle incorporates round holes and transverse slots at 3-in. intervals in both legs. Round holes give positive bearing for bolts. Transverse slots permit overlapping and

splicing for greater length, or nesting for additional strength and rigidity. A wrench and hacksaw are the only tools needed for assembly. No clips or hooks are required; drilling and welding are unnecessary. Dexion slotted angle is a packaged product. Each package contains ten 10-ft lengths of angle and 75 nuts and bolts. *Acme Steel Co.*

For more data circle No. 34 on postcard, p. 109.

Turn Page



Hinged-steel belting handles scrap as well as hot heavy and abrasive castings. Belt is economical . . . maintenance-free.

Now is the time to put AUTOMATION to work . . . Now is the time to cut production costs . . . May-Fran engineers design and build complete scrap handling systems for the automatic removal of machine turnings or chips. May-Fran conveyors will transmit scrap to ultimate point of disposal.

Press Scrap systems can be made completely automatic. Hinged-steel belt will take scrap from presses, handle it through blanking, shearing, forming and baling processes, and deliver it to rail cars.

May-Fran is prepared to engineer, fabricate and install complete conveyor systems to your specifications.

DESIGNERS AND ENGINEERS
OF COMPLETE SCRAP
HANDLING SYSTEMS

MAY-FRAN

ENGINEERING, INC.

Write today for complete information on how an automatic scrap removal system will cut your production costs.

Bulletin MF-530 describes the new Hinged-Steel conveyor belt.

Bulletin MF-640 describes the Chip-Tote conveyor which removes scrap from operating machines.



5013-MP

1698 CLARKSTONE ROAD
CLEVELAND 12, OHIO



Instrument tests ferrous parts for quality

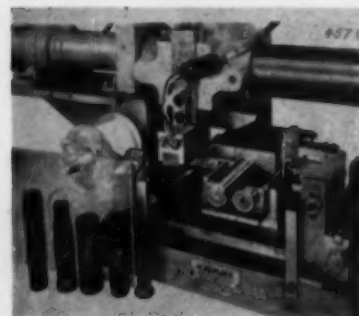
The magnetic comparator provides a non-destructive, quick, simple method of testing ferrous parts for quality. Rods, bolts, springs, shafts, shell cases, and other parts can be compared with a pre-selected standard to detect a difference in composition, heat-treatment, or other characteristics which alter the re-

sistivity or magnetic properties. In many cases, the instrument will distinguish between steels with a difference in hardness as little as two points of Rockwell, or composition of 0.1 pct carbon. A testing rate up to 1200 pieces an hour is possible. *Sunshine Scientific Instrument.*

For more data circle No. 35 on postcard, p. 109.

Mandrel-cradle fixture

New fixture for holding plastic, metal and wood parts for mechanical marking combines a driven rotary mandrel and a set of roller bearing cradle rolls to accomplish the controlled rotation of parts to be marked—when substantial marking pressure is necessary. The illustration shows the fixture assembled



in an Acromark air operated Model 9AA marking machine with electrically heated marking head. Marking is applied under heated pressure through a roll leaf transfer or color pigment tape. Overall size, complete including roll leaf feed and reel, exclusive of gear and rack operating mechanism, is approximately 14 in. long x 10 in. deep x 6 in. high. *Acromark Co.*

For more data circle No. 36 on postcard, p. 109.

Flute polishing wheel

New abrasive wheels developed for polishing flutes of taps and drills provide faster polishing through self-dressing qualities and maximum contact with the metal surface. The wheel is available up to 10 in. diam with face thicknesses to 1/2 in. Arbor diameters range from 1/4 to 1/2 in. Wheel may run at 8000 sfpm. *Sandusky Abrasive Wheel Co.*

For more data circle No. 37 on postcard, p. 109.



**ADVANCED
CHEMICALS
AND
EQUIPMENT**

*for cleaning and
processing in Business,
Industry, and Agriculture*




KELITE patented products with exclusive features bring new efficiency to business and industry. That's why the green and yellow **KELITE** drum is now a familiar sight all over America. For free illustrated Bulletin 136 which describes the remarkable **KELITE** High Volume Steam Cleaner... or a **KELITE** Service Engineer to consult on any cleaning problem, large or small... phone your local **KELITE** office or write **KELITE**, 1250 N. Main Street, Los Angeles 12, California.

Division Offices in
Los Angeles, Berkeley Heights, N.J., Chicago, Dallas, Mexico City, Toronto

Service Offices in 98 Principal American Cities and 16 Countries Abroad

NEW EQUIPMENT

Welder-conditioner

As a welder, the unit joins cylindrical sections of reactive metals under closely controlled conditions to produce clean, sound welds with deep penetration. As a surface conditioner, the unit progressively melts the entire surface of ingots,



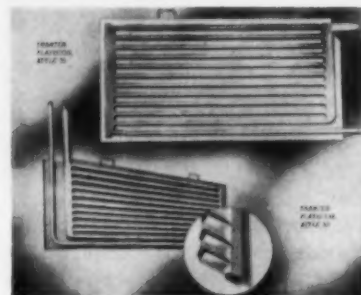
eliminating surface imperfections more than $\frac{3}{8}$ in. deep and producing a clean smooth surface in an annealed condition. Built to high vacuum standards, the leak rate of the equipment is less than 50 microns per hr pressure rise so that high purity and close control of the protective atmosphere is insured.

Vacuum Specialties, Inc.

For more data circle No. 38 on postcard, p. 109.

Heat transfer units

Heat transfer units are said to cut costs in industry by effecting time-savings in installation, operation and maintenance. Known as Tranter Platecoil, the product is fabricated by embossing half of a fluid passage on each of two sheets of metal and then seam and spot welding them together. The plate thus



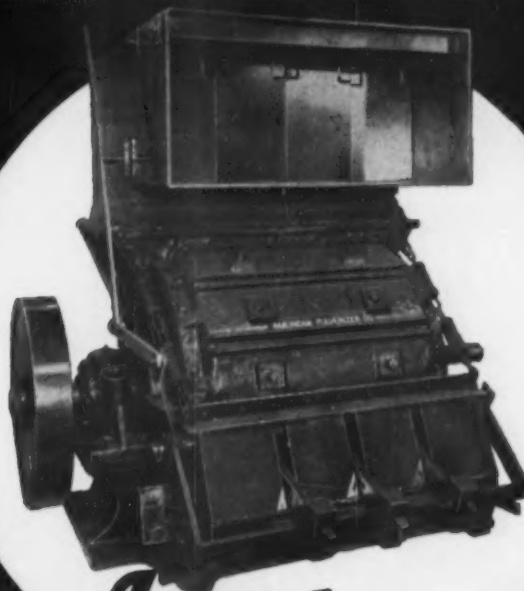
formed results in a compact unit, through which heating or cooling media can be circulated. Two styles have header construction and are designed for vapor phase medium such as steam. A third style has serpentine passages and is intended principally for liquid heating and cooling media. *Tranter Mfg., Inc.*

For more data circle No. 39 on postcard, p. 109.

Turn Page

CASH IN YOUR CHIPS

Change Metal Turnings Waste
into More Profitable Shoveling **CHIPS**



American
METAL TURNINGS

CRUSHERS

No progressive, profit-conscious company—who produces 10 or more tons of metal turnings per month—can afford to ignore the profit potential of a modern chip salvage system . . . with an American Metal Turnings Crusher at the core.

American installation profits include: \$4 more per ton for chips than for machine turnings; up to 50 gallons per ton in cutting oil recovery; 75% less storage; easier, faster handling.

How many profit dollars are you losing under present operations? If, for example, you're currently producing 20 tons of turnings a month . . .

THIS COULD BE YOUR PROFIT STORY FOR NEXT YEAR!

240 Tons Metal Turnings per Year	\$ 960.00
(20 tons/month at \$4 extra per ton)	
6,000 Gallons Recovered Cutting Oil at 30¢/Gal.	\$1,800.00
(50 gals. per ton x 240 tons = 12,000 gals.)	
Half of this, 6,000 gals., can be credited to use of chips instead of turnings in reclamation)	
Estimated Savings in Manpower, Storage, Tools, Maintenance, Freight, etc.	\$ 300.00
TOTAL GROSS PROFIT	\$3,060.00



WRITE for Metal Turnings Crusher Bulletin.

1439 MACKLINE AVE. • ST. LOUIS 10, MO.



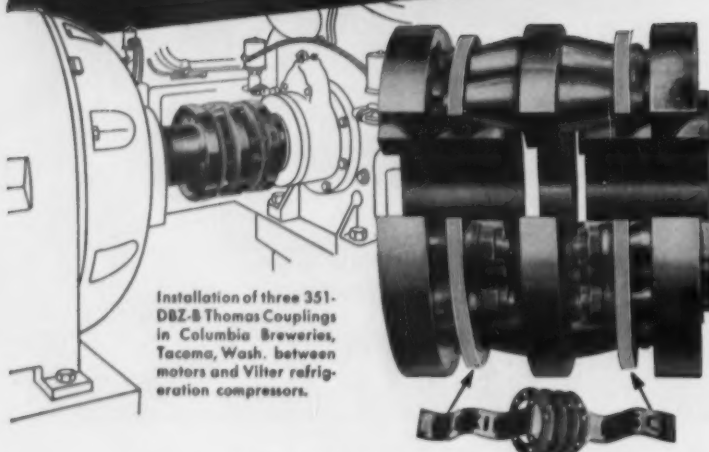
Honing machine for fine finish and accuracy

New hand honing machine, Model No. 5, is for OD and ID parts ranging from $\frac{1}{8}$ to 1 in. diam. A feature is the spindle drive, speed of which may be varied from 160 to 1600 rpm by turning a small lever. Spindle speed may be changed while the spindle is rotating and is infinitely variable through the speed range which is controlled electronically. A $\frac{1}{2}$ hp motor and eddy current clutch

drives the spindle. A light pressure on the foot pedal which is assembled in the center of the machine, will release the brake, start the spindle to rotate and feed the honing stones out to an adjustable preset stop. When foot pedal is released the honing stones retract, current to clutch is cut off and brake stops the spindle rotation. *Staple Engineering Co.*

For more data circle No. 40 on postcard, p. 109.

THOMAS FLEXIBLE COUPLINGS... for more years of better service!



Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

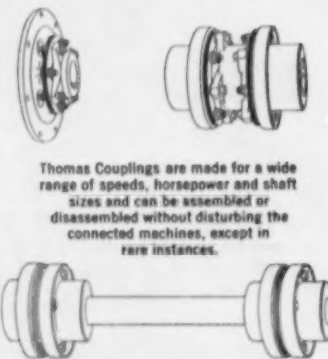
Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.



Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.

Supply car

New tool and supply car of 2000-lb capacity takes tools and supplies to the job from truck or bus. It is all tubular high carbon steel construction and designed to safely



carry heavy loads of ties, rails, supplies and tools. The car pushes easily on its ball bearing cast steel wheels. Platform is 48 x 45 in. Car breaks into two sections for easy handling and transportation. *Nolan Co.*

For more data circle No. 41 on postcard, p. 109.

Lift-rotate spindle

New lift-rotate and scanning spindle for induction heating is a work-handling machine for automatically moving parts, gears and shafts through induction heating coils and quenching them, following a preset cycle. Maximum work load of the device is 50 lb with $\frac{1}{4}$ cu ft of free air per cycle. Power for the $\frac{1}{4}$ -hp rotate motor is 220/440 v, 50/60 cycle, 3 phase with a rotational speed of 145 rpm. Scanning speed range is $\frac{1}{4}$ to 2 ips, with an accuracy of ± 2 pct for a given setting and temperature. *Westinghouse Electric Corp.*

For more data circle No. 42 on postcard, p. 109.

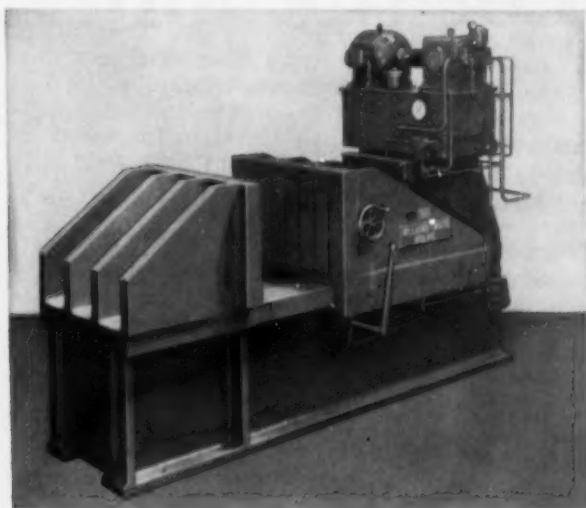
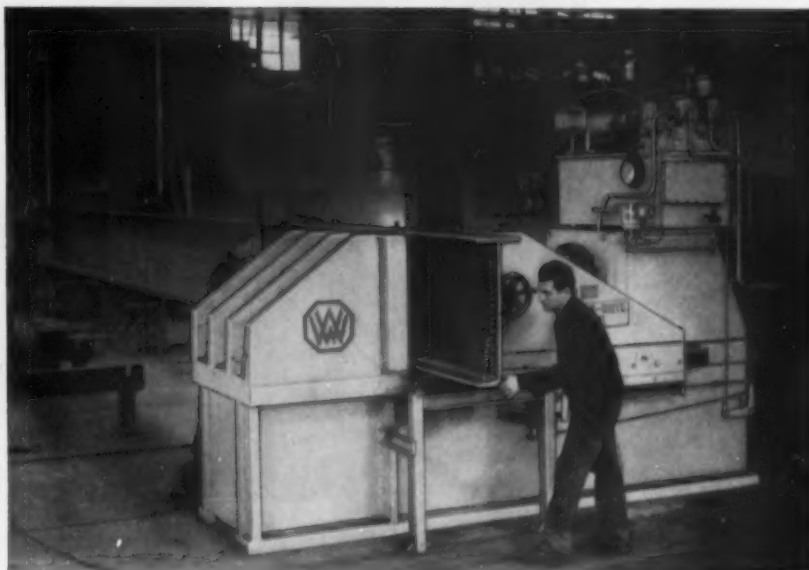


WILLIAMS-WHITE

Horizontal Bender and Straightener

The versatility of the horizontal press is well represented by the 200 Ton Hydraulic Bender and Straightener illustrated, in the installation view at right. The 30" x 48" crosshead and end lug make this an excellent machine for straightening I-beams, channels and other sections.

The forward travel of the crosshead is adjustable by the handwheel mounted on the side of the crosshead. In the event the stroke is not sufficient to complete the desired bending or straightening operation, the operator merely turns the handwheel and the crosshead continues forward a distance proportionate to the movement of the wheel.



WILLIAMS-WHITE & COMPANY machinery is custom built to your specifications! Our designers and engineers are at your service, without obligation, to help you select capacity and type of machine most suited for your requirements. For more information consult your WILLIAMS-WHITE & CO. representative or write us direct.

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It takes more than machines to make steel plates. It takes people. At Claymont, this emphasis on people reflects itself in personalized attention to every order—large or small.

Every step of the way, the handling of your order is under the painstaking supervision of experienced engineers, metallurgists, laboratory analysts, and skilled workmen.

When you order from Claymont you can always count on carbon or alloy plates that are truly tailored to your individual requirements. We make sure of it—because *we're always on top of the job.*

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2841

The Iron Age SUMMARY . . .

Summer steel order pace an eye-opener to optimists . . . Producers striving to maintain production . . . But vacation-maintenance slowdown looms.

Fast Pace Continues . . . Steel demand is highballing into the summer months at an all-time high. Incoming orders continue to exceed shipments. The terrific pace is an eye-opener to the most optimistic among steel producers.

The situation places the mills in a tough spot. They are trying to maintain production in order to cut into backlogs and avoid further extension of delivery promises.

Maintenance Problem . . . But producers also know that a summer letdown is inevitable. It may amount to no more than a few points from the present ingot rate. But at today's pace even a few points mean a lot.

Necessary maintenance has been postponed about as long as it can be on some equipment. Steelmaking furnaces have been pushed to the limit. Blast furnaces have been operated to the hilt in order to provide more hot iron and to offset effect of record steel production on scrap supply. The wear and tear is beginning to tell.

But Pressure Holds . . . Also, vacation schedules and warm weather always cost the mills some production.

But the pressure from consumers will hold

steady even though there will be some consumer plant shutdowns. Most of these plants plan to accept steel shipments during vacation.

Strike-price Hedging . . . Another factor is steel labor negotiations, which will get underway June 7. Although the betting favors a peaceful settlement, there is a certain amount of strike hedging, particularly among tinplate consumers. Other users are pressing for delivery to beat the steel price increase that is certain to follow.

The question of consumer inventories is both-ering some people, but there is still no evidence that much steel has been going into stock. The auto companies, for instance, have been chewing up steel so fast that, if anything, their inventories are considered low. Some Detroit sources believe that even if there is an auto strike, the car producers would require at least 60 days to build adequate inventories.

Record Year Possible . . . Meanwhile, more steel producers are thinking in terms of a possible record production year in 1955. If production continues at about the present pace—and there is a good chance that it will—1953's record of 111.6 million tons would be broken.

Steel Output, Operating Rates

	This Week†	Last Week	Month Ago	Year Ago
Production (Net tons, 000 omitted)	2,340	2,340	2,316	1,746
Ingot Index (1947-49=100)	145.5	145.5	144.0	108.7
Operating Rates				
Chicago	99.5	99.5	99.5	85.5
Pittsburgh	99.0	97.0*	99.0	71.0
Philadelphia	96.2	98.0	96.2	59.0
Valley	97.0	98.0*	95.0	68.0
West	100.2	102.9*	100.8	80.5
Detroit	95.0	96.0	90.0	88.0
Buffalo	105.0	105.0	105.0	67.5
Cleveland	103.9	104.4*	98.2	67.0
Birmingham	96.0	96.0	93.5	78.5
S. Ohio River	72.3	72.2*	93.5	82.5
Wheeling	97.0	97.0*	98.0	90.0
St. Louis	106.1	106.1	98.1	72.5
Northeast	90.0	90.0	104.3	62.5
Aggregate	97.0	97.0	96.0	73.0

*Revised. †Tentative

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	4.797	4.797	4.797	4.634
Pig Iron (Gross ton)	\$56.59	\$56.59	\$56.59	\$56.59
Scrap, No. 1 hvy (gross ton)	\$34.00	\$34.00	\$35.00	\$28.50
Nonferrous				
Aluminum, ingot	23.20	23.20	23.20	21.50
Copper, electrolytic	36.00	36.00	36.00	30.00
Lead, St. Louis	14.80	14.80	14.80	13.80
Magnesium, ingot	29.25	29.25	29.25	27.75
Nickel, electrolytic	67.67	67.67	67.67	63.08
Tin, Straits, N. Y.	91.625	91.50	91.125	93.75
Zinc, E. St. Louis	12.00	12.00	12.00	10.50

Tinplate Is on Way to Record

Increased manufacture of cans, some strike hedging combine to up demand . . . Plates are now tightest single product with structurals crowding sheets . . . Warehouses busy.

◆ IT'S BEGINNING to look as though tin mill shipments this year will exceed the all-time record established in 1954. Last year, mills shipped a total of 5.7 million tons, including 3.7 million tons of electrolytic, 1.3 million tons of hot dip, and 673,000 tons of black plate.

Tinplate mills have been operating at a terrific pace since beginning of the year. Both domestic and foreign consumers have been pressuring for delivery, and order books indicate that the strong pace is likely to continue through '55.

Shipments of hot dip and electrolytic tinplate in first quarter of this year totaled 1,365,220 tons, or an annual rate of 5,460,880. Shipments have been accelerating in second quarter. Of the total first quarter shipments, electrolytic accounted for 1,099,723 tons and hot dip 265,497 tons. Blackplate figures were not available.

The economic boom in the U. S. and Europe has contributed to the strong demand for tin mill products. On top of this, domestic can companies have been laying up extra inventory just on the chance that a steel strike might cut off their supplies. It's a good bet that steel negotiations will be settled peacefully this year, but the can-makers were burned badly during the 1952 walkout and have since clung firmly to a policy of building inventories until steel discussions definitely are settled.

Elsewhere in the product list, the story continues pretty much the same. There may be a slight easing in merchant wire products demand in some sections, but this situation does not appear to be general. The warehouse boom continues to grow and some distributors are concerned over possible shortages of some products.

SHEETS AND STRIPS . . . Carry-overs in most market areas have lengthened to the point where "dropping" July, as many mills intended, won't even make their books current. Four weeks appears to be the minimum in the Midwest with Chicago and Detroit out as far as 6 weeks to some mills. There is little difference in tightness between hot and cold-rolled sheet. Both are gone for the third quarter in Chicago. Only consolation in Pittsburgh is that deliveries are running no further behind. In extra tight Chicago market, customers are trying to line up fourth quarter space even though mills are reluctant to discuss it. And buyers are disappointed about what they hear about available rolling space. Cold-rolled strip continues strong in the wake of terrific demand for slit sheets. Galvanized and tinplate are on quota for remainder of the year in most areas.

BARS . . . Third quarter books are rapidly filling up in most areas although there appears to be space remaining for many sizes and specifications. Automotive demand continues to pace the market with farm equipment and implement manufacturers in Chicago demanding their share. Pittsburgh mills are confident that full production of bars is in order at least through the third quarter and well into the fourth.

PLATES . . . It has to be conceded that plates have become tightest item on the list. In some markets, sheet coils are as far behind, but the im-

portant factor is that plate deliveries continue to be extended. Plates are also the strongest in demand at the warehouse level. In Pittsburgh and Chicago, third quarter books are full and customers are making their fourth quarter hopes felt. This situation continues to be complicated by pressure for ingots for sheets, not rolling space. Buyers are going out of their own territories trying to get on the books, but not too much luck.

STRUCTURALS AND SHAPES . . . Light structurals are almost as bad as plate from the customer point of view. All structurals are sold out in Chicago through the third quarter with customers whispering about fourth to anyone who will listen. In East and West Coast big highway and bridge building projects are making it tough for mills to meet delivery schedules. Pittsburgh reports that order books will be filled throughout entire year as soon as they are opened.

PIPE AND TUBING . . . Some fourth quarter books are open and oil country and merchant pipe continue to lead the way in seamless demand in Pittsburgh. In the East, delivery delays run as high as 6 weeks for seamless. Butt-weld is still available in some quantities in June, but rapidly running out.

WIRE PRODUCTS . . . Merchant wire is the only lagging product in the entire product list and this appears to be centralized in Chicago. A steady increase in merchant wire in the East brightens the picture there. Demand is still solid in Pittsburgh. Manufacturers wire third quarter demand is good.

WAREHOUSES . . . Plate buying leads the parade of mill customers to warehouse doors. But warehousemen say that it's no easier for them to replenish their inventories than for any other customer. As warehouse business picks up, as it continues to do, the chronic complaint of being shorted by the mills in time of shortage is repeated. At the same time, few warehouses report large tonnage orders for cold-rolled sheet despite all the noise about a sheet shortage. Business in all products continues brisk and most warehouses are operating at near 1953 level.

STAINLESS . . . Undiminished construction plus increased use in business building for stainless products is helping keep stainless in the same league with coils and plates in tightness.

Purchasing Agent's Checklist

MARKETS: Molybdenum finds wide new uses p. 53

WAREHOUSES: Join the steel scramble p. 47

MACHINE TOOLS: Salesmen mount selling artillery p. 75

Comparison of Prices

(Effective May 31, 1955)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	May 31 1955	May 24 1955	May 3 1955	June 1 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.05¢	4.05¢	4.05¢	3.925¢
Cold-rolled sheets	4.95	4.95	4.95	4.775
Galvanized sheets (10 ga.)	5.45	5.45	5.45	5.275
Hot-rolled strip	4.05	4.05	4.05	3.925
Cold-rolled strip	5.79	5.79	5.79	5.515
Plate	4.225	4.225	4.225	4.10
Plates wrought iron	9.30	9.30	9.30	9.30
Stain's C-R strip (No. 302)	41.50	41.50	41.50	41.50

Tin and Template: (per base box)				
Tinplate (1.50 lb.) cokes	\$9.05	\$9.05	\$9.05	\$8.95
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.65
Special coated mfg. terms	7.85	7.85	7.85	7.75

Bars and Shapes: (per pound)				
Merchant bars	4.30¢	4.30¢	4.30¢	4.16¢
Cold-finished bars	5.40	5.40	5.40	5.22
Alloy bars	5.075	5.075	5.075	4.875
Structural shapes	4.25	4.25	4.25	4.10
Stainless bars (No. 302)	35.50	35.50	35.50	35.50
Wrought iron bars	10.40	10.40	10.40	10.40

Wire: (per pound)				
Bright wire	5.75¢	5.75¢	5.75¢	5.525¢
Rails: (per 100 lb.)				
Heavy rails	\$4.45	\$4.45	\$4.45	\$4.325
Light rails	5.35	5.35	5.35	5.20

Semi-finished Steel: (per net ton)				
Re-rolling billets	\$64.00	\$64.00	\$64.00	\$62.00
Slabs, re-rolling	64.00	64.00	64.00	62.00
Forging billets	78.00	78.00	78.00	75.50
Alloy blooms, billets, slabs	86.00	86.00	86.00	82.00

Wire Rod and Skelp: (per pound)				
Wire rods	4.675¢	4.675¢	4.675¢	4.525¢
Skelp	3.90	3.90	3.90	3.75

Finished Steel Composite: (per pound)				
Base price	4.797¢	4.797¢	4.797¢	4.634¢

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite
Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

	May 31 1955	May 24 1955	May 3 1955	June 1 1955
Pig iron: (per gross ton)				
Foundry, del'd Phila.	\$61.19	\$61.19	\$61.19	\$61.19
Foundry, Valley	58.50	58.50	58.50	58.50
Foundry, Southern, Cin'ti	60.43	60.43	60.43	60.43
Foundry, Birmingham	52.88	52.88	52.88	52.88
Foundry, Chicago	56.50	56.50	56.50	56.50
Basic, del'd Philadelphia	60.27	60.27	60.27	60.27
Basic, Valley furnace	58.00	58.00	58.00	58.00
Malleable, Chicago	58.50	58.50	58.50	58.50
Malleable, Valley	58.50	58.50	58.50	58.50
Ferromanganese, cents per lb.	9.50¢	9.50¢	9.50¢	10.00¢
2 7/8 pct Mn base.				

Pig Iron Composite: (per gross ton)				
Pig iron	\$58.50	\$58.50	\$58.50	\$58.50

Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	\$24.50	\$24.50	\$24.50	\$24.50
No. 1 steel, Phila. area	35.00	35.00	35.00	22.75
No. 1 steel, Chicago	32.50	32.50	33.50	32.50
No. 1 bundles, Detroit	27.00	27.00	27.00	26.00
Low phos., Youngstown	35.50	35.50	35.50	31.50
No. 1 mach'y cast, Pittsburgh	43.50	43.50	45.50	48.50
No. 1 mach'y cast, Philadelphia	44.50	44.50	44.50	39.50
No. 1 mach'y cast, Chicago	44.50	45.50	46.50	42.00

Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	\$34.00	\$34.00	\$35.00	\$28.55

Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	\$13.25	\$13.25	\$13.00	\$14.38
Foundry coke, prompt	16.25	16.25	16.75	16.75

Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	34.00	34.00	34.00	30.00
Copper, Lake, Conn.	36.00	36.00	36.00	30.00
Tin, Straits, New York	91.625¢	91.50¢	91.125	93.75
Zinc, East St. Louis	12.00	12.00	12.00	10.50
Lead, St. Louis	14.50	14.50	14.50	13.50
Aluminum, virgin ingot	23.25	23.25	23.25	21.50
Nickel, electrolytic	67.67	67.67	67.67	68.00
Magnesium, ingot	29.25	29.25	29.25	27.75
Antimony, Laredo, Tex.	28.50	28.50	28.50	28.50

† Tentative. ‡ Average. * Revised.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

STAINLESS STEEL

Base price cents per lb. f.o.b. m. i.

← To identify producers, see Key on P. 139 →

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem B3	58.00	58.50	59.00	59.50	
Birdboro, Pa. B6	58.00	58.50	59.00	59.50	
Birmingham R3	52.35	52.85			
Birmingham W9	52.35	52.85			
Birmingham W4	52.35	52.85	56.50		
Buffalo R3	56.00	56.50	57.00		
Buffalo H1	56.00	56.50	57.00		
Buffalo W6	56.00	56.50	57.00	57.50	
Chicago I4	56.00	56.50	56.50	57.00	
Cleveland A3	56.00	56.50	56.50	57.00	61.00
Cleveland A5	56.00	56.50	56.50		
Danversfield L3	52.50	52.50	52.50		
Detroit H4	56.00	56.50	56.50	57.00	
Erie H1	56.00	56.50	56.50	57.00	
Evart M6		61.00	61.50		
Fontana K1	62.00	62.50			
Geneva, Utah C7	56.00	56.50			
Granite City G2	57.90	58.40	58.90		
Hubbard Y1			56.50		
Minneapolis C6	56.00	56.00	56.00		
Monessen P6	56.00		56.50		
Neville Isl. P4	56.00	56.50	57.00		
N. Tonawanda T1					
Pittsburgh U1	56.00		56.50	57.00	
Sharpsville S3	56.00	56.50	56.50	57.00	
Se. Chicago R3	56.00		56.50		
Steelton B3	58.00	58.50	59.00	59.50	64.00
Swedeland A2	56.00	56.50	56.50	57.00	
Tulsa H4	56.00	56.50	56.50	57.00	
Troy, N. Y. R3	58.00	58.50	59.00	59.50	64.00
Youngstown Y1			56.50	57.00	

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct excess low phos., 1.75 to 2.50 pct) 50¢ per ton for each 0.50 pct manganese over 1 pct, 50¢ per ton for 0.5 to 0.75 pct nickel, \$1 for each additional, 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content 0.70 and over.
Silvery Iron: Buffalo, H1, \$65.25; Jackson, J1, G1, \$65.00. Add \$1.00 per ton for each 0.50 pct silicon over base (0.61 to 0.50 pct) up to 17 pct. Add \$1 per ton for 0.75 pct or more phosphorus. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferro-silicon prices are \$1 over comparable silvery iron.

Product	301	302	303	304	316	321	347 Ch	410	416	430
Ingot, re-rolling	16.75	17.75	19.25	19.00	29.75	23.50	35.00	14.00	—	14.25
Slabs, billets, re-rolling	21.00	23.25	25.25	24.50	38.00	30.25	48.75	18.25	—	18.5
Forg. discs, die blocks, rings	39.00	39.00	42.00	41.25	61.75	40.25	—	31.00	31.75	41.7
Billets, forging	30.00	30.25	32.75	31.75	48.25	36.00	54.75	24.00	24.50	24.5
Bars, wires, structurals	35.75	36.00	38.75	38.00	57.25	42.75	64.25	28.75	29.25	29.2
Plates	37.75	38.00	40.25	40.50	60.50	40.50	69.25	30.00	30.50	30.5
Sheets	41.75	42.00	49.25	44.50	64.50	51.25	77.00	34.25	41.25	34.7
Strip, hot-rolled	30.25	32.50	37.25	35.00	55.00	41.75	63.00	28.25	—	27.6
Strip, cold-rolled	38.75	42.00	46.00	44.50	64.50	51.25	77.00	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; McKeesport, Pa., U1; Washington, Pa., W2, J2; Baltimore, E1; Middletown, O., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U2; New Castle, Ind., J2; Ft. Wayne, J4; Philadelphia, D3.

Strip: Midland, Pa., C11; Cleveland, A5; Carnegie, Pa., S2; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leeburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Middletown, O., A7; Harrison, N. J., D3; Youngstown, C5; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (25¢ per lb higher) W1 (25¢ per lb higher); New Bedford, Mass., R6.

Bar: Baltimore, A7; Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A5; Waukegan, A5; Canton, O., T5; Ft. Wayne, J4; Philadelphia, D3.

Wire: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A5; Monessen, P1; Syracuse, C11; Bridgeville, U2.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11.

Plates: Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., J2; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatsville, Pa., C19; Philadelphia, D3.

Forged discs, die blocks, rings: Pittsburgh, C11; Syracuse, C11; Fordak, Mich., A3; Washington, Pa., J2.

Forgings: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11.

Market Remains Unsettled

Major buy strengthens Pittsburgh prices . . . Buying lags, prices of steelmaking grades hold in East . . . Chicago market off . . . Composite holds.

◆ SCRAP market presented a jumbled picture this week as reports varied widely with different sections.

In Pittsburgh the purchase of a major consumer strengthened current prices for openhearth scrap and supplies of these grades are tightening.

Philadelphia price for No. 1 heavy melting remained at \$35.50 on the upside as the price slide of recent weeks was checked. Dealers report business is off 30 to 40 pct in this area and the market is still on the shaky side.

In Chicago dealers continue to hold scrap against a market rise but price of No. 2 heavy melting was off \$1. Detroit market was quiet. Prices for steelmaking grades dropped sharply in Birmingham.

Reflecting a market that varied from strong to weak to quiet, THE IRON AGE Heavy Melting Steel Scrap Composite held at \$34.00.

Preliminary figures for 1955 show actual scrap exports of 316,049 tons in February; 349,355 in March; 470,701 in April; and 145,194 for the first 15 days of May. Apparent decline in May is attributed to cargo-for-cargo export controls taking effect.

Pittsburgh . . . The market is firmer this week as a large consumer purchased a substantial tonnage of openhearth scrap at current prices. The brokers are hard at it digging up enough dealer scrap to fill the latest openhearth orders at these prices. A tonnage of industrial bundles is reported to have been sold at \$36.80. Blast furnace scrap prices are unchanged although a distress sale was reported at 50¢ under IRON AGE prices.

Chicago . . . The market slipped again last week despite purchases of No. 2 dealer bundles, some electric furnaces sales, and the prospect of fresh trading in factory grades. No. 2 hvy melting, already weak, was traded in limited amounts at \$28 and \$29, while a lack of fresh buying in No. 1 steelmaking grades served to weaken the outlook for both No. 1 dealer bundles and No. 1 dealer hvy melting. No. 1 had been offered and refused at \$34 and by the week's end, limited offers to consumers running as low as \$32 were attracting little fresh business. Despite these low offering prices, it's notable that the tonnages offered were small, and that material is now being laid down at the current low dealer selling prices in expectation of a stronger market following immediately any mill purchase amounting to a fair tonnage.

Philadelphia . . . Price of No. 1 heavy melting remains at \$35.50 on the upside, with a reported softening of 50¢ on the bottomside in the price of No. 2 heavy melting, effecting a spread of \$2 for the grade. Blast furnace and low phos grades are holding firm. Heavy breakable cast is down \$1 against last week's list. Generally, the market is slow with spotty buying prevailing.

New York . . . There have been no new significant domestic buys in the area and prices remain unchanged. Reports on activity vary from quiet to brisk.

Detroit . . . Automotive lists out last week were off again on an average of \$1. No mill activity has been reported yet and dealers and brokers are uncertain as to whether any local buys will be made. Meanwhile the outlook is pessimistic. Most dealers and brokers think there is a definite possibility of an auto strike and are afraid of the depressing effect it will have on their business. No price changes.

Cleveland . . . Blast furnace grades in Cleveland and the Valley are off 50¢ a ton this week. The decline is based on purchases by three mills in the Cleveland market, which in turn affected the Valley. Steelmaking grades held unchanged, although a Valley consumer purchased a small lot of No. 1 bundles at a higher price. This was offset by a larger purchase by another mill at existing prices.

Cincinnati . . . A large consumer will enter the market this week to make commitments for June delivery. Indications were that prices of steelmaking and blast furnace grades will remain unchanged.

Boston . . . Market continues dull in this area with the same conditions holding. Pittsburgh consumers are not in the market; very few eastern mills are buying; export is off. No. 2 bundles are particularly slow, being almost in the nominal price class.

Birmingham . . . Prices for some scrap items now reflect the weakness indicated for some time although the largest buyer of openhearth scrap still is out of the market. Although some resistance from dealers is expected, brokers feel prices they are quoting may go even lower. The reason is a good inventory at this time and reduced production when vacations start. The cast market continues steady. Exports are at standstill.

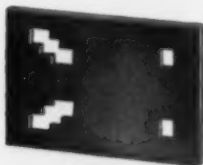
St. Louis . . . Borings and turnings are down \$1 effective with commitments for June shipment in line with the same reduction in other items a week earlier. Receipts in the market continue equal to the melt with local areas supplying the necessary amounts. Railroad lists closing last week brought prices in line with present quotations.

Buffalo . . . Market in this area is quiet and prices remain unchanged. Expected entry of a major consumer into the market next week should tell whether recent sluggishness has weakened prices.

West Coast . . . Adequate supplies are holding prices steady in Seattle, San Francisco and Los Angeles areas. Export activity continues but supply has been equal to demand so far.



FLAME-CUT



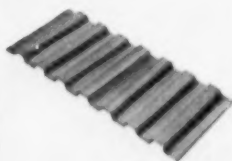
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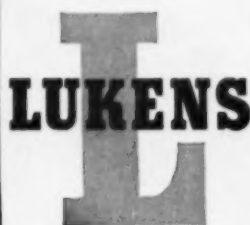
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A Division of Lukens Steel Company, Coatesville, Pennsylvania

Scrap Prices (Effective May 31, 1955)

Pittsburgh

No. 1 hvy. melting	\$24.00 to \$25.00
No. 2 hvy. melting	21.00 to 22.00
No. 1 bundles	24.00 to 25.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	20.50 to 21.50
Mixed bor. and ma. turn.	20.50 to 21.50
Shoveling turnings	24.50 to 25.50
Cast iron borings	24.50 to 25.50
Low phos. punch'g. plate	27.00 to 28.00
Heavy turnings	32.00 to 33.00
No. 1 RR. hvy. melting	26.50 to 27.50
Scrap rails, random lgth.	44.00 to 45.00
Rails 2 ft and under	50.00 to 51.00
RR. steel wheels	42.50 to 43.50
RR. spring steel	42.50 to 43.50
RR. couplers and knuckles	42.50 to 43.50
No. 1 machinery cast.	43.00 to 44.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	34.00 to 35.00

Chicago

No. 1 hvy. melting	\$23.00 to \$24.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 factory bundles	23.00 to 24.00
No. 1 dealers' bundles	22.00 to 23.00
No. 2 dealers' bundles	22.00 to 23.00
Machine shop turn.	15.00 to 17.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. forge crops	35.00 to 36.00
Low phos. punch'g. plate	35.00 to 36.00
Low phos. 3 ft and under	35.00 to 36.00
No. 1 RR. hvy. melting	26.00 to 27.00
Scrap rails, random lgth.	42.00 to 43.00
Rolling rails	51.00 to 52.00
Rails 3 ft and under	48.00 to 49.00
Locomotive tires, cut	35.00 to 36.00
Cut bolsters & side frames	37.00 to 38.00
Angles and splice bars	42.00 to 43.00
RR. steel car axles	41.00 to 42.00
RR. couplers and knuckles	40.00 to 41.00
No. 1 machinery cast.	44.00 to 45.00
Cupola cast.	41.00 to 42.00
Heavy breakable cast.	32.00 to 33.00
Cast iron brake shoes	33.00 to 34.00
Cast iron car wheels	37.00 to 38.00
Malleable	45.00 to 46.00
Stove plate	31.00 to 32.00

Philadelphia Area

No. 1 hvy. melting	\$24.50 to \$25.50
No. 2 hvy. melting	20.50 to 21.50
No. 1 bundles	24.50 to 25.50
No. 2 bundles	26.00 to 27.00
Machine shop turn.	20.50 to 21.50
Mixed bor. and turn.	20.50 to 21.50
Cast iron borings	20.50 to 21.50
Shoveling turnings	23.00 to 24.00
Clean cast chem. borings	28.00 to 29.00
Low phos. 5 ft and under	39.00 to 40.00
Low phos. 2 ft and under	40.00 to 41.00
Low phos. punch'g. plate	40.00 to 41.00
Elec. furnace bundles	38.00 to 39.00
Heavy turnings	34.00 to 35.00
RR. steel wheels	40.00 to 41.00
RR. spring steel	40.00 to 41.00
Rails 18 in. and under	50.00 to 51.00
Cupola cast.	36.00 to 37.00
Heavy breakable cast.	39.00 to 40.00
Cast iron car wheels	44.00 to 45.00
Malleable	44.00 to 45.00
Unstripped motor blocks	27.00 to 28.00
No. 1 machinery cast.	44.00 to 45.00
Charging box cast.	37.00 to 38.00

Cleveland

No. 1 hvy. melting	\$21.50 to \$22.50
No. 2 hvy. melting	26.00 to 27.00
No. 1 bundles	21.50 to 22.50
No. 2 bundles	23.00 to 24.00
No. 1 busheling	21.50 to 22.50
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	22.00 to 23.00
Cut structural plates, 2 ft & under	39.00 to 40.00
Drop forge flashings	31.50 to 32.50
Low phos. punch'g. plate	32.50 to 33.50
Foundry steel, 3 ft & under	25.00 to 26.00
No. 1 RR. heavy melting	35.00 to 36.00
Rails 3 ft and under	48.00 to 49.00
Rails 18 in. and under	49.00 to 50.00
Railroad grate bars	26.00 to 27.00
Steel axle turnings	26.00 to 27.00
Railroad cast.	44.00 to 45.00
No. 1 machinery cast.	44.00 to 45.00
Stove plate	43.00 to 44.00
Malleable	44.00 to 45.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	\$34.00 to \$35.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 bundles	34.00 to 35.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	18.50 to 19.50
Shoveling turnings	24.50 to 25.50
Cast iron borings	24.50 to 25.50
Low phos. plate	35.00 to 36.00

Buffalo

No. 1 hvy. melting	\$29.00 to \$30.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 busheling	29.00 to 30.00
No. 1 bundles	29.00 to 30.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	20.50 to 21.50
Shoveling turnings	21.50 to 22.50
Cast iron borings	20.50 to 21.50
Low phos. plate	32.00 to 33.00
Scrap rails, random lgth.	35.00 to 36.00
Rails 2 ft and under	42.00 to 43.00
RR. steel wheels	36.00 to 37.00
RR. spring steel	36.00 to 37.00
RR. couplers and knuckles	36.00 to 37.00
No. 1 machinery cast.	40.00 to 41.00
No. 1 cupola cast.	36.00 to 37.00

Detroit

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$26.50 to \$27.50
No. 2 hvy. melting	21.00 to 22.00
No. 1 bundles, openhearth	26.50 to 27.50
No. 2 bundles	18.00 to 19.00
New busheling	26.50 to 27.50
Drop forge flashings	26.50 to 27.50
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	14.50 to 15.50
Shoveling turnings	15.50 to 16.50
Cast iron borings	15.50 to 16.50
Low phos. punch'g. plate	27.50 to 28.50
No. 1 cupola cast.	38.00 to 39.00
Heavy breakable cast.	27.00 to 28.00
Stove plate	31.00 to 32.00
Automotive cast.	40.00 to 41.00

St. Louis

No. 1 hvy. melting	\$30.00 to \$31.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	23.50 to 24.50
Machine shop turn.	14.50 to 15.50
Cast iron borings	16.50 to 17.50
Shoveling turnings	16.50 to 17.50
No. 1 RR. hvy. melting	35.00 to 36.00
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	47.00 to 48.00
Locomotive, tires uncured	36.50 to 37.50
Angles and splice bars	36.00 to 37.00
Std. steel car axles	37.00 to 38.00
RR. spring steel	42.00 to 43.00
Cupola cast.	42.00 to 43.00
Hvy. breakable cast.	34.00 to 35.00
Cast iron brake shoes	32.00 to 33.00
Stove plate	35.00 to 36.00
Cast iron car wheels	35.00 to 36.00
Malleable	35.00 to 36.00
Unstripped motor blocks	33.50 to 34.50

Boston

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$26.00 to \$27.00
No. 2 hvy. melting	21.00 to 22.00
No. 1 bundles	26.00 to 27.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	26.00 to 27.00
Elec. furnace, 3 ft & under	31.00 to 32.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and short turn.	13.00 to 14.00
Shoveling turnings	14.00 to 15.00
Clean cast chem. borings	15.00 to 16.00
No. 1 machinery cast.	31.00 to 32.00
Mixed cupola cast.	29.00 to 30.00
Heavy breakable cast.	27.00 to 28.00
Stove plate	27.00 to 28.00
Unstripped motor blocks	17.00 to 18.00

New York

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$30.50
No. 2 hvy. melting	27.00
No. 2 bundles	\$22.00 to 23.00
Machine shop turn.	10.50 to 11.50
Mixed bor. and turn.	11.50 to 12.50
Shoveling turnings	13.50 to 14.50
Clean cast chem. borings	20.00 to 21.00
No. 1 machinery cast.	37.00 to 38.00
Mixed yard cast.	31.00 to 32.00
Charging box cast.	31.00 to 32.00
Heavy breakable cast.	21.00 to 22.00
Unstripped motor blocks	22.00 to 23.00

Birmingham

No. 1 hvy. melting	\$29.00 to \$30.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 bundles	29.00 to 30.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	19.00 to 20.00
Electric furnace bundles	31.00 to 32.00
Bar crops and plate	36.00 to 37.00
Structural and plate, 2 ft.	36.00 to 37.00
No. 1 RR. hvy. melting	36.00 to 37.00
Scrap rails, random lgth.	41.00 to 42.00
Rails, 18 in. and under	45.00 to 46.00
Angles & splice bars	43.00 to 44.00
Revolving rails	43.00 to 44.00
No. 1 cupola cast.	45.00 to 46.00
Stove plate	42.00 to 43.00
Charging box cast.	22.00 to 23.00
Cast iron car wheels	32.00 to 33.00
Unstripped motor blocks	24.50 to 25.50
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$31.50 to \$32.50
No. 2 hvy. melting	27.50 to 28.50
No. 1 bundles	31.50 to 32.50
No. 2 bundles	22.50 to 23.50
Machine shop turn.	16.50 to 17.50
Mixed bor. and turn.	17.50 to 18.50
Shoveling turnings	19.50 to 20.50
Cast iron borings	17.50 to 18.50
Low phos., 18 in. & under	37.00 to 38.00
Rails, random lengths	41.00 to 42.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast.	40.00 to 41.00
Hvy. breakable cast.	34.00 to 35.00
Drop broken cast.	44.00 to 45.00

San Francisco

No. 1 hvy. melting	\$30.00
No. 2 hvy. melting	28.00
No. 1 bundles	29.00
No. 2 bundles	25.00
No. 3 bundles	21.00
Machine shop turn.	10.00
Cast iron borings	9.00
No. 1 RR. hvy. melting	30.00
No. 1 cupola cast.	40.00

Los Angeles

No. 1 hvy. melting	\$30.00
No. 2 hvy. melting	28.00
No. 1 bundles	29.00
No. 2 bundles	23.00
No. 3 bundles	20.00
Machine shop turn.	8.00
Shoveling turnings	10.00
Cast iron borings	10.00
Elec. turn, 1 ft. and under	30.00
No. 1 RR. hvy. melting	30.00
No. 1 cupola cast.	\$41.00 to 42.00

Seattle

No. 1 hvy. melting	\$33.00
No. 2 hvy. melting	29.00
No. 2 bundles	23.00
No. 3 bundles	19.00
No. 1 cupola cast.	35.00
Mixed yard cast.	35.00

Hamilton, Ont.

No. 1 hvy. melting	\$34.00
No. 2 hvy. melting	31.00
No. 1 bundles	34.00
No. 2 bundles	28.00
Mixed steel scrap	28.00
Bushelings	29.00
Bush., new fact prep'd	32.00
Bush., new fact unprep'd	28.00
Machine shop turn	16.00
Short steel turnings	21.00
Mixed bor. and turn.	\$16.00 to 17.00
Rails, rerolling	33.00
Cast scrap	42.00 to 45.00



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Offer Proposals on Aluminum

House subcommittee recommends additional stockpile diversion, further restrictions on aluminum exports to ease shortage . . . Will study need for capacity expansion.

♦ **ALUMINUM**—or rather the lack of it continues to be a hot subject. The House subcommittee on minerals and raw materials late last week rounded out the first phase of its probe into the aluminum shortage.

Not too surprisingly the House group arrived at the conclusion that "a serious shortage exists" and added that "unless additional supplies of raw material are made available to nonintegrated users during the second half of 1955, many small business firms in the aluminum industry will encounter further difficulties." Spokesmen for aluminum extruders had testified earlier that some in their industry would be forced to close down unless more aluminum is made available.

As a result of its hearings the subcommittee came up with the following recommendations:

(1) That "a sufficient amount" of aluminum scheduled for delivery to the stockpile during the second half be diverted, and that Office of Defense Mobilization and General Services Administration supervise distribution of the stockpile-diverted metal—making certain that nonintegrated users receive "equitable" amounts.

(2) It was also suggested that Dept. of Commerce impose further restrictions on aluminum exports.

(3) In addition the House sub-

committee recommended that Dept. of Interior, Dept. of Commerce, Office of Defense Mobilization and General Services Administration consider whether or not another round of primary aluminum production capacity is needed to meet civilian, military and defense demands.

With the first part of its investigation over, the House group itself is now going to mull over the question of whether it should study the need for a third round of aluminum expansion.

While all the talk about aluminum scarcities and questions about whether another government assisted capacity buildup is needed, was going on, several companies made known their plans to increase aluminum output in the future.

Office of Defense Mobilization said it had received an application for a certificate of necessity from St. Joseph Lead Co. and Pittsburgh Coal Co. for construction of an \$85 million aluminum plant. Capacity of the proposed plant is estimated at between 50,000 to 60,000 tons. If the plan goes through it would make the new St. Joe-Pittsburgh Coal organization the fifth aluminum producer in the U. S.

Company officials say the project is still highly tentative. Chances of the plan's receiving ODM ap-

proval are good because of all the current talk about the need for more aluminum production capacity and since the new plant presumably will be coal-powered, it would help out one of the currently few remaining sick industries in the U. S.

Also on the aluminum expansion theme: Reynolds Metals Co. says it has completed plans to go ahead with a new reduction facility with a capacity of 25,000 tons. Plant was planned as an addition to facilities at Sheffield, Ala. Tax difficulties, however, are causing the firm to consider another location.

And Anaconda, last week, reported it expects to have its first potline in operation sometime in July. Second potline will be in operation shortly thereafter. Estimated capacity is 60,000 tons.

End of the first phase of the House subcommittee's aluminum investigation saw aluminum producers cleared of any suspicion that they were not giving independent fabricators a fair share of the metal in accordance with their contractual obligations. Testimony by spokesmen for the Big Three showed these firms have shipped more metal to non-integrated aluminum fabricators than was actually required.

Also, on the question of Reynolds and Kaiser not having signed the amended agreement that they would ship stockpile diverted aluminum to independents, it was shown, that in anticipation of the diversion of stockpile deliveries, these firms made commitments to deliver more metal to independents than would normally be required.

COPPER . . . Demand for June copper is strong and the market is certain to remain pinched through the month. Reflecting the continued high demand and scarcity of the metal, leading custom smelters upped buying prices .25¢ to .50¢ per lb last week.

LEAD, ZINC . . . Market for lead softened slightly, with sales for the week ended May 25 dropping to around 3500 tons compared with the previous week's 9000 tons level. Reports of a possible zinc price increase were taken pretty much in stride.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	May 25	May 26	May 27	May 28	May 30	May 31
Copper, electro, Conn.	36.00	36.00	36.00	36.00	....	36.00
Copper, Lake, delivered	36.00	36.00	36.00	36.00	....	36.00
Tin, Straits, New York	91.75	91.75	91.75	....	....	91.625*
Zinc, East St. Louis	12.00	12.00	12.00	12.00	....	12.00
Lead, St. Louis	14.80	14.80	12.00	14.80	....	14.80

Note: Quotations are going prices

*Tentative

Nonferrous Prices (Effective May 31, 1955)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Alloy	Flat Sheet		Plate	
	0.032 in.	0.081 in.	0.136 in.	0.250 in.
1100, 3003.....	39.1	37.1	35.9	35.5
3004.....	44.0	39.8	38.1	37.6
5052.....	46.7	41.9	40.2	39.3
2024-O, -OAL.....	49.4	40.8	39.3	39.4
7075-O, -OAL.....	60.8	49.1	46.8	46.8

Extruded Solid Shapes: Shape factors 1 to 6, 38.7¢ to 86.7¢; 12 to 14, 39.4¢ to \$1.04; 24 to 26, 42.2¢ to \$1.35; 36 to 38, 49.8¢ to \$1.97.
Rod, Round: Rolled, 1.064-4.5 in. 1100-F, 48.6¢ to 40.1¢; cold finished, 0.375-3.499 in. 1100-F, 47.9¢ to 42.4¢.

Screw Machine Stock: Rounds, 2011-T3, 1/4-1/32 in., 65.5¢ to 50.1¢; 5/16-1/2 in., 49.9¢ to 46.9¢; 1/2-5/8 in., 45.7¢ to 42.7¢. Base 5009 lb.

Drawn Wire: Coiled, 0.051-0.374 in., 1100, 47.1¢ to 35.8¢; 5052, 56.7¢ to 44.4¢; 2017-T4, 64.3¢ to 44.7¢; 6061-T4, 59.5¢ to 44.1¢.

Extruded Tubing: Rounds, 6063-T5, OD 1/4-2 in., 44.4¢ to 64.8¢; 2-4 in., 40.3¢ to 64.6¢; 4-6 in., 40.8¢ to 69.5¢; 6-9 in., 41.4¢ to 62.1¢.
Roofing Sheet: Flat, per sheet, 0.032-in., 42 1/2" x 60-in., \$2.995; x 96-in., \$4.801; x 120-in., \$6.002; x 144-in., \$7.202. Coiled sheet, per lb., 0.019 in. x 28 in., 30.9¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: F81-O 1/4 in., 59¢; 3/16 in., 60¢; 1/8 in., 59¢; 0.064 in., 76¢; 0.032 in., 97¢. Specification grade higher. Base 30,000 lb.

Extruded Round Rod: M, diam 1/4 to 0.311 in., 79¢; 1/2 to 1 in., 62.5¢; 1 1/4 to 1.749 in., 59¢; 2 1/2 to 5 in., 54.5¢. Other alloys higher. Base up to 1/4 in. diam, 10,000 lb; 1/4 to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 67.3¢; 0.22 to 0.25 lb, 5.9 in., 64.3¢; 0.50 to 0.59 lb, 8.6 in., 61.7¢; 1.8 to 2.59 lb, 19.5 in., 59.8¢; 4 to 6 lb, 28 in., 55¢. Other alloys higher. Base, in weight per ft of shape: Up to 1/4 lb, 10,000 lb; 1/4 to 1.5 lb, 20,000 lb; 1.5 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD 1/4 to 5/16 in., \$1.46; 5/16 to 3/4 in., \$1.32; 3/4 to 1 in., 99¢; 1 to 2 in., 82¢; 0.165 to 0.219 in. wall: OD, 1/4 to 1 in., 67¢; 1 to 2 in., 63¢; 3 to 4 in., 62¢. Other alloys higher. Base, OD: Up to 1 1/2 in., 10,000 lb; 1 1/2 to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, \$14.00-\$14.60; alloy \$16.00-\$16.75; Plate, HR, commercially pure, \$11.50-\$12.00; alloy, \$12.50-\$12.75; Wire, rolled and/or drawn, commercially pure, \$10.50-\$11.00; alloy, \$12.50; Bar, HR or forged, commercially pure, \$8.50-\$8.75; alloy, \$8.50-\$9.00.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR.....	102	78	99
Strip, CR.....	102	78	99
Rod, Bar, HR.....	87	69	93
Angles, HR.....	87	69	93
Plate, HR.....	97	82	95
Seamless Tube, 122	108	108	153
Shot, Blocks.....	85	...	...

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper.....	53.79	...	54.86
Copper, h-f.....	54.76	...	...
Copper, drawn.....	...	52.36	...
Low brass.....	49.75	49.69	...
Yellow brass.....	46.27	46.21	...
Red brass.....	50.99	50.93	...
Naval brass.....	44.30	45.56	...
Leaded brass.....	...	43.09	...
Com. bronze.....	52.78	52.72	...
Mang. bronze.....	53.73	47.83	49.39
Phos. bronze.....	75.03	75.53	...
Muntz metal.....	45.14	43.95	45.20
Ni silver, 10 pct 60.20	63.28	66.24	...
Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.	...	...	...
Strip.....	...	...	\$1.74
Rod, bar, wire.....	...	...	1.71

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed.....	23.20
Aluminum pig.....	21.60
Antimony, American, Laredo, Tex.....	28.50
Beryllium copper, per lb conta'd Be.....	\$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be.....	\$72.35
Bismuth, ton lots.....	\$2.25
Cadmium, del'd.....	\$1.70
Cobalt, 97-99% (per lb).....	\$2.60 to \$2.67
Copper, electro, Conn. Valley.....	36.00
Copper, Lake, delivered.....	36.00
Gold, U. S. Trans., per troy oz.....	\$35.00
Indium, 99.8%, dollars per troy oz.....	\$2.25
Iridium, dollars per troy oz.....	\$90 to \$100
Lead, St. Louis.....	14.50
Magnesium, 99.5+%, f.o.b. Freeport, Tex., 10,000 lb, pig.....	28.50
ingot.....	29.25
Magnesium, sticks, 100 to 500 lb.....	49.00
Mercury, dollars per 75-lb flask, f.o.b. New York.....	\$301 to \$303
Nickel electro, f.o.b. N. Y. warehouse.....	67.67
Nickel oxide sinter, at Copper Cliff, Ont., contained nickel.....	60.75
Palladium, dollars per troy oz.....	\$18 to \$20
Platinum, dollars per troy oz.....	\$76 to \$79
Silver, New York, cents per troy oz.....	90.16
Tin, New York.....	91.625
Titanium, sponge, grade A-1.....	\$3.95
Zinc, East St. Louis.....	12.00
Zinc, New York.....	12.60
Zirconium, sponge.....	\$10.00

REMELED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot.....	34.50
No. 115.....	33.75
No. 120.....	33.75
No. 123.....	33.25
80-10-10 ingot.....	38.00
No. 305.....	36.25
88-10-2 ingot.....	47.25
No. 210.....	43.75
No. 215.....	43.75
No. 245.....	39.75
Yellow ingot.....	29.25
No. 405.....	29.25
Manganese bronze.....	31.75
No. 421.....	31.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys.....	27.75-28.25
0.30 copper, max.....	27.50-28.00
0.60 copper, max.....	26.90-27.00
Piston alloys (No. 122 type).....	25.50-26.00
No. 12 alum. (No. 2 grade).....	26.00-26.50
108 alloy.....	27.00-28.00
195 alloy.....	27.00-28.00
13 alloy (0.60 copper max.).....	27.50-28.00
ASX-679.....	26.00-26.50

Steel deoxidizing aluminum, notch-bar

granulated or shot

Grade 1—95-97 1/2%.....	26.00-27.00
Grade 2—92-95%.....	25.00-26.00
Grade 3—90-92%.....	24.50-25.00
Grade 4—85-90%.....	23.50-24.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper.....	44.92
Cast, oval, 15 in. or longer.....	39.78
Electrodeposited.....	46.42
Flat rolled.....	46.42
Brass, 80-20.....	43.515
Cast, oval, 15 in. or longer.....	20.25
Zinc, flat cast.....	18.50
Ball, anodes.....	90.50*
Nickel, 99 pct plus.....	\$1.70
Cadmium.....	...
Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn.....	94 1/2

Chemicals

(Cents per lb, f.o.b. shipping points)	
Copper cyanide, 100 lb drum.....	63.00
Copper sulphate, 99.5 crystals, bbl.....	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed.....	31.25*
Nickel chloride, 300 to 400 lb.....	43.50*
Silver cyanide, 100 oz. lots, per oz.....	75 1/2
Sodium cyanide, 9% pct domestic 200 lb drums.....	19.26
Zinc cyanide, 100 lb drum.....	54.30
*Effective Jan. 3.	

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper.....	32	31 1/2
Yellow brass.....	23 1/2	22
Red brass.....	28 1/2	27 1/2
Comm. bronze.....	29 1/2	28 1/2
Mang. bronze.....	22 1/6	21 1/2
Yellow brass rod ends.....	23 1/2	22

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire.....	35
No. 2 copper wire.....	33 1/2
Light copper.....	31 1/2
*Refinery brass.....	31
*Dry copper content.	

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire.....	34 1/2
No. 2 copper wire.....	33
Light copper.....	31 1/2
No. 1 composition.....	27 1/2
No. 1 comp. turnings.....	27
Rollled brass.....	21
Brass pipe.....	20 1/2
Radiators.....	21
Aluminum	
Mixed old cast.....	14 1/2—17
Mixed new clips.....	16 1/2—17
Mixed turnings, dry.....	15 1/2—16

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire.....	32 1/2—33
No. 2 heavy copper and wire.....	31 —31 1/2
Light copper.....	29 —29 1/2
New type shell cuttings.....	29 —29 1/2
Auto radiators (unsweated).....	18 1/2—19
No. 1 composition.....	24 1/2—25
No. 1 composition turnings.....	24 —24 1/2
Unlined red car boxes.....	18 1/2—19
Cocks and faucets.....	20 —20 1/2
Mixed heavy yellow brass.....	16 1/2—17
Old rolled brass.....	18 —18 1/2
Brass pipe.....	20 —20 1/2
New soft brass clippings.....	23 —23 1/2
Brass rod ends.....	20 1/2—21
No. 1 brass rod turnings.....	19 1/2—20
Aluminum	
Alum. pistons and struts.....	11 —11 1/2
Aluminum crankcases.....	11 —11 1/2
1100 (28) aluminum clippings.....	13 1/2—14
Old sheet and utensils.....	11 —11 1/2
Borings and turnings.....	7 1/2—8
Misc. cast aluminum.....	11 —11 1/2
2024 (24s) clippings.....	13 —13 1/2
Zinc	
New zinc clippings.....	7 1/2
Old zinc.....	4 1/2—5
Zinc routings.....	3 —3 1/2
Old die cast scrap.....	3 1/2—3 3/4
Nickel and Monel	
Pure nickel clippings.....	75
Clean nickel turnings.....	55 —65
Nickel anodes.....	75
Nickel rod ends.....	75
New Monel clippings.....	36 —37 1/2
Clean Monel turnings.....	27 1/2
Old sheet Monel.....	32 —33
Nickel silver clippings, mixed.....	18
Nickel silver turnings, mixed.....	15
Lead	
Soft scrap lead.....	11 1/2—11 3/4
Battery plates (dry).....	6 1/2—6 3/4
Batteries, acid free.....	4 1/2
Magnesium	
Segregated solids.....	18 1/2—19
Castings.....	17 1/2—18
Miscellaneous	
Block tin.....	76 —77
No. 1 pewter.....	58 —59
No. 1 auto babbitt.....	48
Mixed common babbitt.....	17 —17 1/2
Solder joints.....	75
Siphon tops.....	15 1/2—16
Small foundry type.....	15
Monotype.....	13 1/2—14
Lino. and stereotype.....	12 —12 1/2
Electrotype.....	9 1/2
Hand picked type shells.....	6 1/2
Lino. and stereo. dross.....	5
Electro dross.....	5

IRON AGE

STEEL
PRICES(Effective
May 31, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply

		BILLETS, BLOOMS, SLABS			PIL- ING	SHAPES STRUCTURALS			STRIP					
		Carbon Revolving Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Carbon	Hi Str. Low Alloy	Carbon Wide- Flange	Hot- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- rolled	Alloy Cold- rolled
EAST	Bethlehem, Pa.			\$86.00 B3		4.30 B3	6.45 B3	4.30 B3						
	Buffalo, N. Y.	\$64.00 B3	\$78.00 B3, R3	\$86.00 B3, R3	5.075 B3	4.30 B3	6.45 B3	4.30 B3	4.05 B3,R3	5.75 R7,S10	6.15 B3	8.425 B3		
	Claymont, Del.													
	Harrison, N. J.													12.45 C11
	Consolidated, Pa.								4.10 A2	5.80 A2	6.15 A2			
	New Bedford, Mass.									6.20 R6				
	Johnstown, Pa.	\$64.00 B3	\$78.00 B3	\$86.00 B3		4.30 B3	6.45 B3		4.05 B3					
	Boston, Mass.									6.30 T8				12.80 T8
	New Haven, Conn.									6.20 D1 6.50 A5				
	Phoenixville, Pa.					4.26 P2		4.30 P2						
	Sparrows Pt., Md.								4.05 B3	5.75 B3	6.15 B3	8.425 B3		
	Bridgeport, Wallingford, Conn.	\$60.00 N8	\$83.00 N8						4.35 N8	6.20 W1			7.00 N8	
	Pawtucket, R. I. Worcester, Mass.									6.30 N7 6.60 A5				12.75 A5 12.80 N7
MIDDLE WEST	Alton, Ill.								4.225 L1					
	Ashland, Ky.								4.85 A7					
	Canton-Massillon, Dover, Ohio		\$80.00 R3	\$86.00 R3, T3										12.45 G4
	Chicago, Ill.	\$64.00 U1	\$78.00 R3, U1,W8	\$86.00 U1, W8,R3	5.075 U1	4.25 U1, W8	6.40 U1, Y1	4.25 U1	4.05 A1,N4, W8	5.85 A1,T8				12.45 T8
	Cleveland, Ohio									5.75 A5,J3		8.60 A5		12.45 A5
	Detroit, Mich.			\$86.00 R5					4.15 G3,M2	5.85 D1,D2, G3,M2,P11	6.25 G3	8.70 D2, G3		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	\$64.00 U1	\$78.00 U1	\$86.00 U1, Y1	5.075 T3	4.25 J3, U1	6.40 U1, J3		4.05 J3, U1,Y1	5.85 J3	6.15 U1, J3,Y1	8.60 Y1	6.70 U1, Y1	
	Sterling, Ill.								4.15 N4					
	Indianapolis, Ind.									5.90 C5				
	Newport, Ky.												6.70 Y5	
	Middletown, Ohio									5.75 A7				
	Niles, Warren, Ohio Sharon, Pa.								4.05 S1,R3	5.75 S1,R3, T4	6.15 S1, R3	8.60 S1, R3	6.70 S1	12.45 S1
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	\$64.00 U1, J3	\$78.00 J3, U1,C11	\$86.00 U1, C11	5.075 U1	4.25 J3, U1	6.40 J3, U1	4.25 U1	4.05 P6	5.75 B4,J3, S7			6.70 S9	12.45 S9
	Portsmouth, Ohio								4.05 P7	5.75 P7				
	Weirton, Wheeling, Follansbee, W. Va.					4.25 W3			4.05 W3	5.75 F3,W3	6.15 W3	8.60 W3		
	Youngstown, Ohio		\$78.00 C10	\$86.00 Y1, C10		4.25 Y1	6.40 Y1		4.05 U1,Y1	5.75 Y1,C5	6.15 U1, Y1	8.60 Y1	6.70 U1, Y1	12.45 C5
WEST	Fontana, Cal.	\$72.00 K1	\$86.00 K1	\$105.00 K1		4.90 K1	7.05 K1	5.25 K1	4.825 K1	7.50 K1	7.25 K1		8.10 K1	14.55 K1
	Genova, Utah		\$78.00 C7			4.25 C7	6.40 C7							
	Kansas City, Mo.					4.30 S2	6.45 S2				6.40 S2		6.95 S2	
	Los Angeles, Torrance, Cal.		\$87.50 B2	\$106.00 B2		4.95 B2, C7	7.10 B2		4.80 B2,C7	7.80 C1				
	Minneapolis, Colo.					4.70 C6			5.15 C6					
	Portland, Ore.					5.00 O2								
	San Francisco, Niles, Pittsburg, Cal.		\$87.50 B2			4.90 B2 4.95 P9	7.05 B2		4.80 B2,C7					
	Seattle, Wash.		\$91.50 B2			5.00 B2	7.15 B2		5.05 B2, P12					
	Atlanta, Ga.								4.25 A8					
SOUTH	Fairfield, Ala. City, Birmingham, Ala.	\$64.00 T2	\$78.00 T2			4.25 C16, R3,T2	6.40 T2		4.85 R3, T2,C16		6.15 T2			
	Houston, Lone Star, Tex.	\$70.00 L3	\$83.00 S2	\$91.00 S2		4.30 S2	6.45 S2				6.40 S2		6.95 S2	

IRON AGE

STEEL
PRICES(Effective
May 31, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL PRICES (Effective May 31, 1955)		SHEETS								WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. hvyr.	Cold-rolled	Galvanized 10 ga.	Enamel- ing 12 ga.	Long Tens 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Hot-rolled 19 ga.	Cokes* 1.25-lb. base box		Electro* 0.25-lb. base box
EAST	Bethlehem, Pa.												
	Buffalo, N. Y.	4.95 B3	4.95 B3				6.10 B3	7.50 B3		4.675 W6	† Special coated mfg. terms deduct 95¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 125 lb. deduct \$2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add \$1.10. Differential 1.00 lb./0.25 lb. add 85¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Censhobocken, Pa.	4.10 A2	5.00 A2				6.15 A2						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.								4.675 B3				
	Fairless, Pa.	4.10 U1	5.00 U1				6.15 U1	7.55 U1			\$8.90 U1	\$7.60 U1	
	New Haven, Conn.												
	Phoenixville, Pa.												
Sparrows Pt., Md.	4.95 B3	4.95 B3	5.45 B3			6.10 B3	7.50 B3	8.20 B3	4.775 B3	\$8.90 B3	\$7.60 B3		
Worcester, Mass.									4.975 A5				
Trenton, N. J.													
MIDDLE WEST	Alton, Ill.									4.85 L1			
	Ashland, Ky.	4.05 A7		5.45 A7	5.375 A7								
	Canton-Massillon, Dover, Ohio			5.45 R1, R3					5.175 R1				
	Chicago, Joliet, Ill.	4.05 A1, W8					6.10 U1			4.675 A5, N4,R3			
	Sterling, Ill.									4.775 N4			
	Cleveland, Ohio	4.05 J3, R3	4.95 J3, R3		5.375 R3		6.10 J3, R3	7.50 J3, R3		4.675 A5			
	Detroit, Mich.	4.15 G3, M2	5.05 G3				6.20 G3	7.60 G3					
	Newport, Ky.	4.05 N5	4.95 N5	5.45 N5									
	Gary, Ind. Harbor, Indiana	4.05 J3, U1,Y1	4.95 J3, U1,Y1	5.45 U1, J3	5.375 J3, U1	5.85 U1	6.10 U1, J3,Y1	7.50 U1, Y1		4.675 Y1	\$8.90 J3, U1,Y1	\$7.50 J3, U1,Y1	6.20 U1, Y1
	Granite City, Ill.	4.25 G2	5.15 G2	5.65 G2	5.575 G2							\$7.60 G2	6.30 G2
	Kokomo, Ind.	4.15 C9		5.55 C9					5.20 C9	4.775 C9			
	Mansfield, Ohio					5.85 E2				5.175 E2			
	Middletown, Ohio		4.95 A7		5.375 A7	5.85 A7							
	Niles, Warren, Ohio Sharon, Pa.	4.05 S1,R3 5.30 N3	4.95 R3 5.975 N3	5.45 N3, R3	6.725 N3	5.85 N3	6.10 S1,R3	7.50 R3			\$8.80 R3	\$7.50 R3	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.05 J3, U1,P6	4.95 J3, U1,P6	5.45 U1	5.375 U1		6.10 J3, U1	7.50 J3, U1	8.20 U1	4.675 A5 4.875 P6	\$8.80 J3, U1	\$7.50 J3, U1	6.20 U1
	Portsmouth, Ohio	4.05 P7	4.95 P7							4.675 P7			
Weirton, Wheeling, Follansbee, W. Va.	4.05 W3, W5	4.95 W3, W5,F3	5.45 W3, W5		5.85 W3, W5	6.10 W3	7.50 W3			\$8.80 W3, W5	\$7.50 W3, W5	6.20 F3, W5	
Youngstown, Ohio	4.05 U1, Y1	4.95 Y1		5.375 Y1		6.10 U1, Y1	7.50 Y1		4.675 Y1				
WEST	Fontana, Cal.	4.825 K1	6.05 K1				6.875 K1	8.55 K1		5.475 K1			
	Geneva, Utah	4.15 C7											
	Kansas City, Mo.									4.925 S2			
	Los Angeles, Torrance, Cal.									5.475 C7, B2			
	Minneapolis, Cal.									4.925 C6			
	San Francisco, Niles, Pittsburg, Cal.	4.75 C7	5.90 C7	6.20 C7						5.325 C7	\$9.55 C7	\$8.25 C7	
	Seattle, Wash.												
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	4.05 R3, T2	4.95 T2	5.45 R3, T2			6.10 T2		5.35 R3	4.675 T2, R3	\$8.90 T2	\$7.60 T2	
	Houston, Tex.									4.925 S2			

IRON AGE

STEEL
PRICES(Effective
May 31, 1955)

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	BARS						PLATES				WIRE
	Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mir.'s. Bright
EAST	Bethlehem, Pa.			5.075 B3	6.625 B3	6.45 B3					
	Buffalo, N. Y.	4.30 B3,R3	4.30 B3,R3	5.45 B3	5.075 B3,R3	6.625 B3,B5	6.45 B3	4.225 B3,R3		6.45 B3	5.75 W6
	Claymont, Del.							4.225 C4	5.80 C4		
	Coatsville, Pa.							4.225 L4	5.80 L4	6.45 L4	
	Conohohocken, Pa.							4.225 A2	5.275 A2	6.45 A2	
	Harrisburg, Pa.							4.225 C3	5.275 C3		
	Hartford, Conn.		5.90 R3		6.925 R3						
	Johnstown, Pa.	4.30 B3	4.30 B3		5.075 B3	6.45 B3	4.225 B3		5.80 B3	6.45 B3	5.75 B3
	Fairless, Pa.	4.45 U1	4.45 U1		5.225 U1						
	Newark, N. J.			5.85 W10		6.90 W10					
	Camden, N. J.			5.85 P10							
	Bridgeport, Putnam, Conn.	4.55 N8		5.95 W10	5.225 N8		4.475 N8				
MIDDLE WEST	Sparrows Pt., Md.	4.30 B3					4.225 B3		5.80 B3	6.45 B3	5.85 B3
	Palmer, Worcester, Roadville, Mansfield, Mass.		5.85 W11 5.95 B3,C14		6.925 A5,B5						6.05 A5, W6
	Alton, Ill.	4.50 L1									5.925 L1
	Ashland, Newport, Ky.						4.225 A7,N5		5.80 N5		
	Canton-Massillon, Mansfield, Ohio	4.40 R1		5.40 R2,R3	5.075 R3,T5	6.625 R2,R3, T5	4.225 E2				
	Chicago, Joliet, Ill.	4.30 U1, N4, W8, R3, P13	4.30 N4,R3, P13	5.40 A5, W10, W8, B3, L2	5.075 U1,R3, W8	6.625 A5, W8, W10, L2, B3	4.225 U1, W8, T3, A1, R3	5.275 U1	5.80 U1	6.45 U1	5.75 A5, R3, N4, W7
	Cleveland, Ohio	4.30 R3	4.30 R3	5.40 A5, C13		6.625 A5, C13	6.45 R3	4.225 J3, R3	5.275 J3	6.45 J3, R3	5.75 A5, C13
	Detroit, Mich.	4.40 G3 4.45 R5		5.40 R5 5.60 B5, P8 5.65 P3	5.075 R5 5.175 G3	6.625 R5 6.825 B5, P3 P8	6.55 G3	4.325 G3		6.55 G3	
	Duluth, Minn.										5.75 A5
	Gary, Ind. Harbor, Crawfordsville	4.30 T3, U1, Y1	4.30 T3, U1, Y1	5.40 M5, R3	5.075 T3, U1, Y1	6.625 M5, R3	6.45 U1, T3, Y1	4.225 T3, U1, Y1	5.275 T3	5.80 U1, Y1	6.45 U1, T3, Y1
	Granite City, Ill.						4.425 G2				
	Kokomo, Ind.										5.85 C9
	Sterling, Ill.	4.40 N4	4.40 N4								5.85 N4
WEST	Niles, Ohio Sharon, Pa.	4.30 R3				6.45 R3	4.225 S1, R3		5.80 S1	6.45 S1	
	Pittsburgh, Pa. Midland, Pa.	4.30 J3, U1, C11	4.30 J3, U1	5.40 A5, C8, C11, J3 W10, B4, R3	5.075 U1, C11	6.625 A5, C11, W10, C8, R3	6.45 J3, U1	4.225 J3, U1	5.275 U1	5.80 U1	6.45 J3, U1
	Pittsburgh, Pa. Midland, Pa.										5.75 A5, J3, P6
	Pittsburgh, Pa. Midland, Pa.										5.75 P7
	Pittsburgh, Pa. Midland, Pa.										
	Pittsburgh, Pa. Midland, Pa.										
	Pittsburgh, Pa. Midland, Pa.										
	Pittsburgh, Pa. Midland, Pa.										
	Pittsburgh, Pa. Midland, Pa.										
	Pittsburgh, Pa. Midland, Pa.										
	Pittsburgh, Pa. Midland, Pa.										
	Pittsburgh, Pa. Midland, Pa.										
	Pittsburgh, Pa. Midland, Pa.										
	Pittsburgh, Pa. Midland, Pa.										
SOUTH	Portsmouth, Ohio										
	Wornton, Wheeling, Follensbee, W. Va.	4.30 W3					4.225 W3, W5				
	Youngstown, Ohio	4.30 U1, Y1, C10, R3	4.30 U1, Y1, R3	5.40 F2, Y1, C10	5.075 U1, Y1, C10	6.625 Y1, C10 6.665 F2	6.45 U1, Y1	4.225 U1, Y1, R5	5.80 Y1	6.45 Y1	5.75 Y1
	Emeryville, Cal.	5.05 J5	5.05 J5								
	Fontana, Cal.	5.00 K1	5.00 K1		6.125 K1		7.70 K1	4.875 K1		6.45 K1	7.15 K1
	Geneva, Utah							4.225 C7		6.45 C7	
	Kansas City, Mo.	4.55 S2	4.55 S2		5.325 S2		6.70 S2				6.00 S2
	Los Angeles, Torrance, Cal.	5.00 B2, C7	5.00 B2, C7	6.85 R3	6.125 B2		7.15 B2				6.70 B2
	Minneapolis, Colo.	4.75 C6	4.75 C6					5.975 C6			6.00 C6
	Portland, Ore.	5.05 O2	5.05 O2								
	San Francisco, Niles, Pittsburg, Cal.	5.00 C7, P9 5.05 B2	5.00 C7, P9 5.05 B2				7.20 B2				6.70 C7
	Seattle, Wash.	5.05 B2, P12, N6	5.05 B2, P12				7.20 B2	5.125 B2		6.70 B2	7.35 B2
	Atlanta, Ga.	4.50 A8	4.50 A8								5.95 A8
	Fairfield, Ala. City, Birmingham, Ala.	4.30 T2, C16, R1	4.30 T2, C16, R1				6.45 T2	4.225 T2, R3		6.45 T2	5.75 R3, T2
	Houston, Ft. Worth, Lone Star, Tex.	4.55 S2	4.55 S2		5.325 S2		6.70 S2	4.55 L3 4.275 S2	5.85 S2	6.50 S2	6.00 S2

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
 A2 Alan Wood Steel Co., Conahocken, Pa.
 A3 Allegheny Ludlum Steel Corp., Pittsburgh
 A4 American Clad Metals Co., Carnegie, Pa.
 A5 American Steel & Wire Div., Cleveland
 A6 Angell Nail & Chaplet Co., Cleveland
 A7 Arco Steel Corp., Middletown, O.
 A8 Atlantic Steel Co., Atlanta, Ga.
 B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
 B2 Bethlehem Pacific Coast Steel Corp., San Francisco
 B3 Bethlehem Steel Co., Bethlehem, Pa.
 B4 Blair Strip Steel Co., New Castle, Pa.
 B5 Bliss & Laughlin, Inc., Harvey, Ill.
 B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
 C1 Calstrip Steel Corp., Los Angeles
 C2 Carpenter Steel Co., Reading, Pa.
 C3 Central Iron & Steel Co., Harrisburg, Pa.
 C4 Claymont Products Dept., Claymont, Del.
 C5 Cold Metal Products Co., Youngstown, O.
 C6 Colorado Fuel & Iron Corp., Denver
 C7 Columbia Geneva Steel Div., San Francisco
 C8 Columbia Steel & Shafting Co., Pittsburgh
 C9 Continental Steel Corp., Kokomo, Ind.
 C10 Copperweld Steel Co., Pittsburgh, Pa.
 C11 Crucible Steel Co. of America, Pittsburgh
 C12 Cumberland Steel Co., Cumberland, Md.
 C13 Cuyahoga Steel & Wire Co., Cleveland
 C14 Compressed Steel Shafting Co., Readville, Mass.
 C15 G. O. Carlson, Inc., Thorndale, Pa.
 C16 Connors Steel Div., Birmingham
 D1 Detroit Steel Corp., Detroit
 D2 Detroit Tube & Steel Div., Detroit
 D3 Driver Harris Co., Harrison, N. J.
 D4 Dickson Weatherproof Nail Co., Evanston, Ill.
 D5 Henry Dison & Sons, Inc., Philadelphia
 E1 Eastern Stainless Steel Corp., Baltimore
 E2 Empire Steel Co., Mansfield, O.
 F1 Firth Sterling, Inc., McKeesport, Pa.
 F2 Fitzsimmons Steel Corp., Youngstown
 F3 Follansbee Steel Corp., Follansbee, W. Va.
 G1 Globe Iron Co., Jackson, O.

G2 Granite City Steel Co., Granite City, Ill.
 G3 Great Lakes Steel Corp., Detroit
 G4 Greer Steel Co., Dover, O.
 H1 Hanna Furnace Corp., Detroit
 I2 Ingersoll Steel Div., Chicago
 I3 Inland Steel Co., Chicago
 I4 Interlake Iron Corp., Cleveland
 J1 Jackson Iron & Steel Co., Jackson, O.
 J2 Jessop Steel Corp., Washington, Pa.
 J3 Jones & Laughlin Steel Corp., Pittsburgh
 J4 Joslyn Mfg. & Supply Co., Chicago
 J5 Judson Steel Corp., Emeryville, Calif.
 K1 Kaiser Steel Corp., Fontana, Cal.
 K2 Keystone Steel & Wire Co., Peoria
 K3 Koppers Co., Granite City, Ill.
 L1 Laclede Steel Co., St. Louis
 L2 La Salle Steel Co., Chicago
 L3 Lone Star Steel Co., Dallas
 L4 Lukens Steel Co., Coatesville, Pa.
 M1 Mahoning Valley Steel Co., Niles, O.
 M2 McLouth Steel Corp., Detroit
 M3 Mercer Tube & Mfg. Co., Sharon, Pa.
 M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
 M5 Monarch Steel Div., Hammond, Ind.
 M6 Mystic Iron Works, Everett, Mass.
 N1 National Supply Co., Pittsburgh
 N2 National Tube Div., Pittsburgh
 N3 Niles Rolling Mill Div., Niles, O.
 N4 Northwestern Steel & Wire Co., Sterling, Ill.
 N5 Newport Steel Corp., Newport, Ky.
 N6 Northwest Steel Rolling Mills, Seattle
 N7 Newman Crosby Steel Co., Pawtucket, R. I.
 N8 Northeastern Steel Corp., Bridgeport, Conn.
 O1 Oliver Iron & Steel Co., Pittsburgh
 O2 Oregon Steel Mills, Portland
 P1 Page Steel & Wire Div., Monaca, Pa.
 P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
 P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
 P4 Pittsburgh Coke & Chemical Co., Pittsburgh
 P5 Pittsburgh Screw & Bolt Co., Pittsburgh
 P6 Pittsburgh Steel Co., Pittsburgh
 P7 Portsmouth Div., Detroit Steel Corp., Detroit
 P8 Plymouth Steel Co., Detroit

P9 Pacific States Steel Co., Niles, Cal.
 P10 Precision Drawn Steel Co., Camden, N. J.
 P11 Production Steel Strip Corp., Detroit
 P12 Pacific Steel Rolling Mills, Seattle
 P13 Phoenix Mfg. Co., Joliet, Ill.
 R1 Reeves Steel & Mfg. Co., Dover, O.
 R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
 R3 Republic Steel Corp., Cleveland
 R4 Roehling Sons Co., John A., Trenton, N. J.
 R5 Rotary Electric Steel Co., Detroit
 R6 Rodney Metals, Inc., New Bedford, Mass.
 R7 Rome Strip Steel Co., Rome, N. Y.
 S1 Sharon Steel Corp., Sharon, Pa.
 S2 Sheffield Steel Corp., Kansas City
 S3 Shenango Furnace Co., Pittsburgh
 S4 Simonds Saw & Steel Co., Fitchburg, Mass.
 S5 Sweet's Steel Co., Williamsport, Pa.
 S6 Standard Forging Corp., Chicago
 S7 Stanley Works, New Britain, Conn.
 S8 Superior Drawn Steel Co., Manaca, Pa.
 S9 Superior Steel Corp., Carnegie, Pa.
 S10 Seneca Steel Service, Buffalo
 T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
 T2 Tennessee Coal & Iron Div., Fairfield
 T3 Tennessee Products & Chem. Corp., Nashville
 T4 Thomas Strip Div., Warren, O.
 T5 Timken Steel & Tube Div., Canton, O.
 T6 Tremont Nail Co., Wareham, Mass.
 T7 Texas Steel Co., Fort Worth
 T8 Thompson Wire Co., Boston
 U1 United States Steel Corp., Pittsburgh
 U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
 U3 Ulfrich Stainless Steels, Wallingford, Conn.
 U4 U. S. Pipe & Foundry Co., Birmingham
 W1 Wallingford Steel Co., Wallingford, Conn.
 W2 Washington Steel Corp., Washington, Pa.
 W3 Weirton Steel Co., Weirton, W. Va.
 W4 Wheeland Tube Co., Wheeland, Pa.
 W5 Wheeling Steel Corp., Wheeling, W. Va.
 W6 Wickwire Spencer Steel Div., Buffalo
 W7 Wilson Steel & Wire Co., Chicago
 W8 Wisconsin Steel Co., S. Chicago, Ill.
 W9 Woodward Iron Co., Woodward, Ala.
 W10 Wycoff Steel Co., Pittsburgh
 W11 Worcester Pressed Steel Co., Worcester, Mass.
 Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (per) 1 c.b. mill. Base price about \$200 per net ton.

	BUTTWELD												SEAMLESS									
	½ in.		¾ in.		1 in.		1¼ in.		1½ in.		2 in.		2½-3 in.		2 in.		2½ in.		3 in.		3½-4 in.	
	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.
STANDARD T. & C.																						
Sparrows Pt. B3	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0								
Youngstown R3	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0								
Fontana K1	10.75	+4.5	13.75	+0.5	16.25	3.0	18.75	3.75	19.25	4.75	19.75	5.25	21.25	5.0								
Pittsburgh J3	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Alton, Ill. L1	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0								
Sharon M3	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0								
Fairless N2	21.75	6.5	24.75	10.5	27.25	14.0	29.75	14.75	30.25	15.75	30.75	16.25	32.25	16.0								
Pittsburgh N1	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Wheeling W5	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0								
Wheeland W4	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0								
Youngstown Y1	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
Indiana Harbor Y1	22.75	7.5	25.75	11.5	28.25	15.0	30.75	15.75	31.25	16.75	31.75	17.25	33.25	17.0								
Lorain N2	23.75	8.5	26.75	12.5	29.25	16.0	31.75	16.75	32.25	17.75	32.75	18.25	34.25	18.0	13.5	+1.50	17.5	0.75	20.0	3.25	21.5	4.75
EXTRA STRONG																						
PLAIN ENDS																						
Sparrows Pt. B3	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0								
Youngstown R3	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0								
Fairless N2	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0								
Fontana K1	14.25	.....	18.25	.....	20.25	.....	20.75	.....	21.25	.....	21.75	.....	22.25	.....							
Pittsburgh J3	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75
Alton, Ill. L1	25.25	11.5	29.25	15.5	31.25	19.0	31.75	17.75	32.25	18.75	32.75	19.25	33.25	18.0								
Sharon M3	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0								
Pittsburgh N1	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75
Wheeling W5	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0								
Wheeland W4	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0								
Youngstown Y1	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75
Indiana Harbor Y1	26.25	12.5	30.25	16.5	32.25	20.0	32.75	18.75	33.25	19.75	33.75	20.75	34.25	19.0								
Lorain N2	27.25	13.5	31.25	17.5	33.25	21.0	33.75	19.75	34.25	20.75	34.75	21.25	35.25	20.0	14.0	.....	19.0	3.25	21.5	5.75	26.5	10.75

Threads only, butt weld and seamless 2 1/4 pt higher discount. Plain ends, butt weld and seamless, 3-in. and under, 4 1/2 pt higher discount. Butt weld jubbos discount, 5 pt.
 Galvanized discounts based on zinc price range of over 9¢ to 11¢ incl. per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: 1/2, 3/4 and 1-in., 2 pt.; 1 1/4, 1 1/2 and 2-in., 1 1/2 pt.; 2 1/2 and 3-in., 1 pt. e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range of over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 12.80¢ per lb.

Steel Prices

(Effective May 31, 1955)

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F.a.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolt Treated
Bessemer U1	4.45	5.25	5.425				
So. Chicago R3				7.30			
Emory T2	4.45	5.35					
Fairfield T2		5.35		5.275			
Gary U1	4.45	5.35		7.30			
Ind. Harbor J3	4.45	5.425	7.30	5.275			
Johnstown B3		5.35					
Joliet U1		5.30	5.425				
Kansas City S2			7.30				11.50
Lackawanna B3	4.45	5.35	5.425		5.275		
Minneapolis C6	4.45	5.50	5.425	7.30	5.275	11.50	
Pittsburgh O1				11.00		11.50	
Pittsburgh P5							11.50
Pittsburgh J3			7.30				
Seattle B3			7.30		5.425	12.00	
Stedion B3	4.45		5.425				
Struthers Y1			7.30				
Terrace C7		5.35			5.425		
Williamsport S3							
Youngstown R3			7.30				

ELECTRICAL SHEETS

E2-Gage F.a.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length)	
		Semi- Processed	Fully Processed
Field	8.025	8.225	
Armature	8.50	8.75	9.25
Elect.	9.10	9.35	9.85
Motor	10.10	10.35	10.85
Dynamo	11.00	11.25	11.75
Trans. T2	11.95	12.20	12.70
Trans. G5	12.30		
Trans. S8	13.00	Trans. S6	14.60
Trans. S2	14.00	Trans. T3	17.10

Producing plants: Booth Bottom (W5); Brackenridge (A5); Granite City (G2); Indiana Harbor (I3); Mansfield (E2); Newport, Ky. (N5); Niles, O. (N3); Vandergrift (U1); Warren, O. (R3); Zanesville (A7).

* Coils 75¢ higher.

CLAD STEEL

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa., L4	*33.60	
Washington, Pa., J3		
Claymont, Del., C9		
New Castle, Ind., T2		29.75
Nickel-carbon		
10 pct. Coatesville, Pa., L4	39.50	
Inconel-carbon		
10 pct. Coatesville, Pa., L4	47.90	
Monel-carbon		
10 pct. Coatesville, Pa., L4	40.80	

* Includes annealing and pickling, sandblasting.

MERCHANT WIRE PRODUCTS

F.a.b. Mill	Standard & Coated Nails		Woven Wire		Fence 9-15 1/2 pt.		Fence Posts		Single Loop Bolo Ties		Galv. Barbed and Twisted Barbed Wire		Mesh Wire Ann'd		Mesh Wire* Galv.	
	Coil	Coil	Coil	Coil	Coil	Coil	Coil	Coil	Coil	Coil	Coil	Coil	Coil	Coil	Coil	Coil
Alabama City R3	137	146		155	150	6.90	7.30									
Aliquippa, Pa. J3	137	149			156	6.90	7.45									
Atlanta A8	139	151		157	164	7.00	7.525									
Bartonsville K2	139	151		157	164	7.00	7.55									
Buffalo W6						6.90	7.30									
Chicago, Ill. N9	137	150		155	163	6.90	7.475									
Cleveland A6	143															
Cleveland A5																
Crawfordsville M9	139	151		157	159	7.00	7.55									
Donora, Pa. A5	137	149		155	162	6.90	7.45									
Duluth A5	137	149	150	155	162	6.90	7.45									
Fairfield, Ala. T2	137	149		155	162	6.90	7.45									
Galveston D9	139															
Houston S2	142	154			164	7.15	7.70									
Johnstown, Pa. B3	137	149														
Joliet, Ill. A5	137	149		155	162	6.90	7.45									
Kahome, Ind. C9	139	148		157	161	7.00	7.55									
Los Angeles B2						7.85										
Kansas City S2	142	150		167	164	7.15	7.90									
Minneapolis C6	142	151	155	160	164	7.15	7.55									
Monessen P6	137	151			163	6.90	7.45									
Nelson, Ill. R3			155													
Pittsburgh, Cal. C7	156	172		179	182	7.85	8.40									
Portsmouth P7						6.90	7.90									
Rankin, Pa. A5	137	149			162	6.90	7.45									
So. Chicago R3	137	146	150		159	6.90	7.30									
S. San Francisco C6				179												
Sparrows Pt. B3	139			157	164	7.00	7.55									
Struthers, O. Y1						6.90	7.55									
Warren A5	143					7.20										
Williamsport, Pa. S5			150													

Cut Nails, carloads, base \$9.30 per keg at Conshohocken Pa. (A2). Galvanized products computed with zinc at 11.0¢ per lb. Exceptions: Alabama City and So. Chicago computed with zinc at 5¢; Chicago, zinc 12¢.

C-R SPRING STEEL

Cents Per Lb F.a.b. Mill	CARBON CONTENT				
	0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.00	1.00-1.33
Bridgeport, New Britain, Conn. N6	5.75	8.05	9.00	11.15	13.80
Buffalo, N. Y. R7	5.75	8.05	9.00	10.95	13.25
Carnegie, Pa. S9	5.75	8.05	9.00	11.15	13.85
Cleveland A5	5.75	8.05	9.00	11.15	13.85
Detroit D1	5.85	8.25	9.20	16.95	
Detroit D2	5.85	8.25	9.20		
Harrison, N. J. C11			9.30	11.45	14.15
Indianapolis C5	6.00	8.20	9.00	11.15	13.85
New Castle, Pa. B4	5.75	8.05	9.00	10.95	
New Haven, Conn. D1	6.20	8.35	9.30	11.25	
Pawtucket, R. I. N7	6.30	8.35	9.30	11.45	14.15
Riverside, Ill. A1	5.85	8.05	9.00	11.15	13.85
Sharon, Pa. S1	5.75	8.05	9.00	11.15	13.85
Trenton R4	6.30	8.35	9.30	11.25	13.80
Wallingford W1	6.20	8.35	9.30	11.45	14.15
Warren, Ohio T4	5.75	8.05	9.00	11.15	13.85
Weirton, W. Va. W3	5.85	8.05	9.00	10.95	13.25
Worcester, Mass. A5	6.00	8.35	9.30	11.45	14.15
Youngstown C5	5.85	8.05	9.00	11.15	13.85

BOILER TUBES

\$ per 100 ft. carload lots, cut 10 to 24 ft. F.a.b. Mill	Size		Seamless		Elec. Weld	
	OD-In.	R.W. Gs.	H.R.	C.D.	H.R.	C.D.
Babcock & Wilcox	2	13	28.33	33.97	27.40	32.95
	2 1/2	12	38.15	45.74	37.00	44.30
	3	12	44.05	52.82	42.72	51.23
	3 1/2	11	51.43	61.66	49.88	59.81
	4	10	60.29	71.88	56.24	67.42
National Tube	2	13	28.33	33.97	27.40	
	2 1/2	12	38.15	45.74	37.00	
	3	12	44.05	52.82	42.72	
	3 1/2	11	51.43	61.66	49.88	
	4	10	60.29	71.88	56.24	
Pittsburgh Steel	2	13	28.33	33.97		
	2 1/2	12	38.15	45.74		
	3	12	44.05	52.82		
	3 1/2	11	51.43	61.66		
	4	10	60.29	71.88		

WARE-HOUSES

City	City Delivery Charge	Sheets		Strip		Plates		Shapes		Bars		Alloy Bars			
		Hot-Rolled	Cold-Rolled	Hot-Rolled	Cold-Rolled	Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled	Cold-Finished	Hot-Rolled	Hot-Rolled	Cold-Drawn	Cold-Drawn	Cold-Drawn
		Galvanized (10 gage)	Hot-Rolled	Cold-Rolled	Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled	Cold-Finished	Hot-Rolled	Cold-Finished	Hot-Rolled	Cold-Drawn	Cold-Drawn	Cold-Drawn
Baltimore	\$.20	6.02	7.51	7.70	6.80	6.37	6.72	6.68	8.02	12.94	12.54	15.34	15.19		
Birmingham	.15	6.35	7.35	8.25	6.40	6.65	6.65	6.50	8.85		16.80		19.80		
Boston	.10	6.50	8.10	9.00											
		7.23	8.23	9.57	7.47	9.75	7.37	7.40	7.20	8.60	12.65	12.60	15.40	15.25	
Buffalo	.25	6.30	7.40	8.94	6.65	7.02	6.60	6.67	6.45	7.40	12.70	12.15	15.10	14.95	
Chicago	.20	6.38	7.38	8.30	6.62		6.52	6.60	6.51	7.25	12.25	12.03	14.60	14.70	
Cincinnati	.20	6.49	7.37	8.25	6.66		6.81	6.86	6.75	7.55	12.55	12.30	14.90	14.95	
		6.53	7.42	8.30	6.91		6.86	6.80							
Cleveland	.20	6.38	7.38	8.25	6.72		6.69	7.02	6.57	7.35	11.96	12.11		14.76	
Denver		6.18	9.00	10.72	8.40		6.10	8.15	8.30	9.92				17.12	
Detroit	.20	6.57	7.57	8.58	6.90		6.80	7.16	6.79	7.54	12.65	12.25	15.05	14.90	
Houston		7.35	8.00	9.93	7.70		7.35	7.60	7.70	9.30		13.25			
			9.99					9.40							
Kansas City	.20	7.05	8.05	8.97	7.29		7.19	7.36	7.18	8.02	13.12	12.72	15.52	15.37	
							7.39								
Los Angeles	.10	7.50	9.35	9.95	7.85		7.45	7.65	7.45	10.15		13.45		16.40	
Memphis	.10	6.79	7.69		6.90		7.01	7.09	6.88	8.65					
Milwaukee	.20	6.47	7.47	8.21	6.71		6.61	6.86	6.60	7.44	12.34	12.14	14.69	14.79	
			8.39												
New Orleans	.15	6.70	7.65	8.23	6.80		6.90	7.05	6.80	8.60					
								10.70							
New York	.10	6.97	7.91	8.79	7.50	10.15	7.27	7.36	7.37	8.73		12.43		15.08	
		7.07	8.54	8.89	7.68		7.37	7.48	7.47	8.83					
Norfolk	.20	7.00			7.10		7.10	7.10	7.10	8.60					
Philadelphia	.10	6.19	7.44	8.28	6.98		6.49	6.54	6.74	7.66	12.61	12.26	15.06	14.99	

Miscellaneous Prices

(Effective May 31, 1955)

TOOL STEEL

F.o.b. mill					
W	Cr	V	Mo	Co	per lb
18	4	1	—	—	\$1.54
18	4	2	—	—	2.245
18	4	2	—	—	1.705
1.5	4	1.5	8	—	.90
6	4	2	8	—	1.39

High-carbon chromium73
Oil hardened manganese405
Special carbon37
Extra carbon31
Regular carbon36
Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

CAST IRON WATER PIPE

Per Net Ton	
6 to 24-in., del'd Chicago	\$111.30 to \$115.30
6 to 24-in., del'd N. Y.	115.00 to 116.00
6 to 24-in., Birmingham	98.00 to 102.50
6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	\$129.50 to \$131.50
Class "A" and gas pipe, 3¢ extra; 4-in. pipe is 5¢ a ton above 6-in.	

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective for 1955 season.

Gross Ton	
Openhearth lump	\$11.25
Old range, bessemer	10.40
Old range, nonbessemer	10.25
Measbl, bessemer	10.25
Measbl, nonbessemer	10.10
High phosphorus	10.00

COKE

Furnace, beehive (f.o.b. oven)		Net-Ton
Connellsville, Pa.		\$13.00 to \$13.50
Foundry, beehive (f.o.b. oven)		
Connellsville, Pa.		\$16.00 to \$16.50
Foundry, oven coke		
Buffalo, del'd		\$28.08
Chicago, f.o.b.		24.50
Detroit, f.o.b.		25.50
New England, del'd		26.05
Seaboard, N. J., f.o.b.		24.50
Philadelphia, f.o.b.		24.00
Swedeland, Pa., f.o.b.		24.00
Painesville, Ohio, f.o.b.		25.50
Erie, Pa., f.o.b.		25.00
Cleveland, del'd		27.43
Cincinnati, del'd		26.56
St. Paul, f.o.b.		23.75
St. Louis, f.o.b.		26.00
Birmingham, f.o.b.		22.65
Lone Star, Tex., f.o.b.		18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (in.)	Length (in.)	Price	Diam. (in.)	Length (in.)	Price
24	84	22.00	48	110	10.80
20	72	21.25	40	100, 110	9.50
18 to 16	72	21.50	38	110	9.50
14	72	22.00	36	110	9.50
12	72	22.25	34	72 to 84	9.55
8 to 10	60	22.75	28	80	9.45
7	60	22.50	17	72	9.55
6	60	25.80	14	72	10.25
4	40	28.50	10, 12	80	11.10
3	40	30.00	8	80	11.40
2 1/2	30	30.75			
2	24	47.75			

* Prices shown cover carbon nipples.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolts

	Discount	
	Less Case	C.
1/2 in. & smaller x 4 in. & shorter	3	23
1/2 in. & smaller x 6 in. & shorter	+3	18
9/16 in. & 5/8 in. x 6 in. & shorter	+4	17
3/4 in. & larger x 6 in. & shorter	+6	15
All diam. longer than 6 in.	+15	8
1/2 in. & smaller x 6 in. & shorter	+3	18
Lag, all diam. x 6 in. & shorter	6	35
Lag, all diam. longer than 6 in.	+3	19
Plow bolts	23	23

Nuts, H.P., C.P., reg. & hvy.

	Discount, Base Discount or Keg	
	Base Discount	or Keg
3/4" or smaller	55	64
3/4" to 1 1/4" inclusive	58	66
1 1/4" to 1 1/2" inclusive	60	67 1/2

C.P. Hex. regular & hvy

All sizes	55	64
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Hot Galv Nuts (all types)

3/4" or smaller	38	50
3/4" to 1 1/4" inclusive	41	52 1/2

Finished, Semi-finished, Slotted or Case-hardened Nuts

All sizes	55	64
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Rivets

	Base per 100 lb	
	Base	Pet Off List
1/2 in. & larger	\$9.35	
7/16 in. and smaller		37

Cap Screws

	Discount	
	H.C. Heat	Bright Treated
New std. hex head, pack-aged		
3/4" x 6" and smaller and shorter	38	28
3/4" x 6", 1" x 6" and shorter	18	1
New std. hex head, bulk*		
5/8" x 6" and smaller and shorter	50	42
3/4" x 6", 1" x 6" and shorter	32	21
*Minimum quantity per item:		
15,000 pieces 1/4", 5/16", 3/8" diam.		
5,000 pieces 7/16", 1/2", 9/16", 5/8" diam.		
2,000 pieces 3/4", 1", 1 1/4" diam.		

Machine Screws & Stove Bolts

	Discount	
	Mach. Screws	Stove Bolts
Packaged, package list	33	43
Bulk, bulk list		
1/4-in. diam.	15,000-99,999	17 59
5/16-in. diam. & under	100,000-199,999	25 63
3/8-in. diam. & larger	200,000 & over	33 67
1/2-in. diam. & larger	15,000-49,999	17 59
All diam.	50,000-99,999	25 63
over 3 in.	100,000-99,999	33 67
long	5,000-49,999	59
	50,000-99,999	63
	100,000 & over	67

Machine Screw & Stove Bolt Nuts

	Discount	
	Hex	Square
Packaged, package list	30	33
Bulk, bulk list		
3/4-in. diam. & smaller	15,000-99,999	15 17
	100,000-199,999	23 25
	200,000 & over	31 33

REFRACTORIES

Fire Clay Brick

Carloads per 1000	
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add \$5.00)	\$114.00
No. 1 Ohio	107.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	107.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50)	17.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	\$120.00
Childs, Hays, Pa.	125.00
Chicago District	130.00
Western Utah	
California	
Super Duty	
Hays, Pa., Athens, Tex., Windham	137.00
Curtner, Calif.	155.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	20.00
Silica cement, net ton, bulk, Hays, Pa.	32.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	21.00
Silica cement, net ton, bulk, Utah and Calif.	

Chrome Brick

Per net ton	
Standard chemically bonded, Balt.	\$86.00
Standards chemically bonded, Curtner, Calif.	96.25
Burned, Balt.	80.00

Magnesite Brick

Standard Baltimore	\$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite

St. %-in., grains	
Domestic, f.o.b. Baltimore in bulk fines removed	\$64.40
Domestic, f.o.b. Chewah, Wash., Luning, Nev.	
in bulk	38.00
in sacks	48.75

Dead Burned Dolomite

Per net ton	
F.o.b. bulk, producing points in: Pa., W. Va., Ohio	\$14.50
Midwest	15.10
Missouri Valley	13.45

FLUORSPAR

Washed gravel, f.o.b. Rosiclare, Ill.	
Price, net ton; effective CaF ₂ content.	
72 1/2% or more	\$44.00
70% or more	42.50
60% or less	38.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f.	
New York, ocean bags	11.25
Canadian sponge iron, Del'd in East, carloads	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	10.75¢
Electrolytic iron, annealed, imported 99.5+% Fe	9.5¢
domestic 99.5+% Fe	37.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	35.5¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe. 63.0¢ to 80.0¢	
Carbonyl iron, size 5 to 10 micron, 98%, 90.8+% Fe. 83.0¢ to 11.45	
Aluminum	31.5¢
Brass, 10 ton lots	39.50¢ to 36.50¢
Copper, electrolytic	51.5¢
Copper, reduced	51.5¢
Cadmium, 100-199 lb. 98¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	\$2.60
Lead	29.50¢
Manganese	87.0¢
Molybdenum, 99%	22.75
Nickel, unannealed	89.50¢
Nickel, annealed	96.50¢
Nickel, spherical, unannealed	93.50¢
Silicon	43.50¢
Solder powder, 7.0¢ to 8.0¢ plus met. value	
Stainless steel, 202	91.0¢
Stainless steel, 316	\$1.10
Tin	14.0¢ plus metal value
Tungsten, 99% (65 mesh)	\$4.05
Zinc, 10 ton lots	\$17.5¢ to 25.0¢

Ferroalloy Prices

(Effective May 31, 1955)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 65-72% Cr, 2% max Si.

0.025% C ..	36.00	0.15% C ...	32.75
0.025% C ..	34.50	0.20% C ...	32.50
0.06% C ..	34.50	0.50% C ...	32.25
0.10% C ..	34.50	1.00% C ...	32.00
0.10% C ..	34.00	2.00% C ...	32.75
65-69% Cr, 4-9% C ..	24.75		
62-66% Cr, 4-6% C, 6.9% Si ..	25.60		

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60.55% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	25.85
Ton lots	28.00
Less ton lots	29.50

High Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, cents per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	\$1.18
0.50% max. C	1.16
9 to 11% C	1.25

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 12.00¢ per lb contained Si. Bulk 2-in. x down, 25.65¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

20-23% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zn, 20% Fe 1/2 in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	16.60
Ton lots	18.10
Less ton lots	19.35

Graphidex No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.50
Ton lots to carload packed	18.50
Less ton lots	20.00

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point

Marietta, Ashtabula, O.; alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	9.50
Clairton, Pa.	9.50
Sheridan, Pa.	9.50
Philo, Ohio	9.50

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 64 pct Mn:

Carloads, bulk	11.85
Ton lots packed	13.45

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese Silicon	
16 to 19%	3% max. \$24.00
19 to 21%	3% max. 26.00
21 to 23%	3% max. 28.50
23 to 25%	3% max. 31.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.00
Ton lots	43.50

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.35 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn

21.35¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

Carloads	Ton	Less	
0.07% max. C, 0.06% P, 90% Mn	32.00	32.85	35.05
0.07% max. C	29.95	31.80	33.80
0.15% max. C	28.45	30.30	31.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si ..	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.00
Ton lots	12.65
Briquet contract basis carlots, bulk, delivered, per lb of briquet	12.45
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$25.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$25.00. Add \$1.00 per ton for each additional 0.50% Si up to and including 17%. Add \$1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96% Si, 2% Fe	30.10	18.00
97% Si, 1% Fe	20.60	18.50

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.55
Ton lots	8.35

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.40
50% Si	12.00	85% Si	16.10
65% Si	13.50	90% Si	17.25

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	\$2.95	\$2.95	\$3.75
Less ton lots	2.40	2.30	4.55

Ferrovandium

25-55% contract, basis, delivered, per pound, contained V.

Openhearth	\$3.00-\$3.10
Crucible	3.10-3.20
High speed steel (Primox) ..	3.30-3.25

Alifer, 20% Al, 40% Si, 40% Fe, Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	9.25¢
Ton lots	10.15

Calcium molybdate, 46.3-46.6% f.o.b. Langloeth, Pa., per pound contained Mo

\$1.25

Ferrocolumbium, 56-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	\$12.00
Less ton lots	12.45

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb cont'd Cb plus Ta....

\$6.25

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langloeth, Pa., per pound contained Mo....

\$1.45

Ferrophosphorus, electric, 22-26%, car lots, f.o.b. Sigio, Mt. Pleasant, Tenn., \$4.00 unitage, per gross ton

\$90.00	
10 tons to less carload	\$110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti

\$1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti

\$1.50	
Less ton lots	\$1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton

\$177.00

Ferrotungsten, 1/4 x down, packed, per pound contained W, ton lots, f.o.b.

\$3.80

Molybde oxide, briquets, per lb contained Mo, f.o.b. Langloeth, Pa.

\$1.27

bags, f.o.b. Washington, Pa., Langloeth, Pa.

\$1.24

Simanal, 20% Si, 20% Mn, 30% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk, lump	15.50¢
Ton lots, packed lump	16.75¢
Less ton lots, lump, packed ..	17.25¢

Vanadium Pentoxide, 96 - 99% V₂O₅ contract basis, per pound contained V₂O₅

\$1.25

Zirconium, contract basis, per lb of alloy.

35-40%, f.o.b. freight allowed, ton lots	26.00¢
12-15%, del'd, lump, bulk-carloads	8.00¢

Boron Agents

Borasil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 2.14% Si, 40-45%, per lb contained B....

\$5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots per pound	10.00¢
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Ferroboreon, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, Ton lots... f.o.b. Wash., Pa.; 100 lb up

10 to 14% B .....	.85
14 to 19% B	1.25
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	\$1.00
No. 6	63¢
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	\$1.45
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd, less ton lots

\$2.05

Silica, contract basis, delivered.

Ton lots	45.00¢
----------------	--------

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FIRE EXIT

CAUTION
KEEP OUT
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CRANE LOADS



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THE CHERRY
CLEAR DO NOT REPAIR
MACHINERY
WHILE IN MOTION

THINK
THE BEST
MONEY SPEND
IS A GOOD WORK
GET THE BEST WORK

DANGER
WEAR LOGGERS
W-10
CLIPPING OF GRINDING

SAFETY
LENS L
ADJUSTIVE
NO IMPROVING

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YOUR STEP

THINK
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NO JOB
TOMORROW

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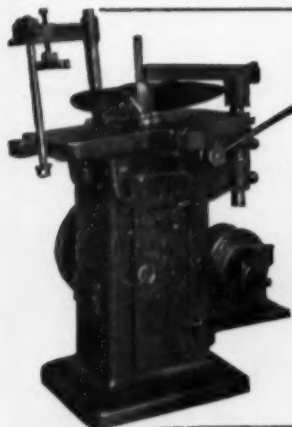


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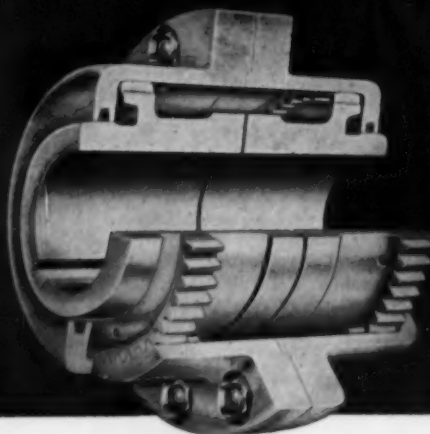
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Boston, Mass.

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Ultimate tensile strength lbs. per sq. in.						
Rolled 1" and under	125,000	115,000	108,000	100,000	90,000	85,000
Rolled 1" and over	125,000	115,000	108,000	100,000	90,000	85,000
Rolled or Forged, over 1"	115,000	108,000	100,000	90,000	85,000	80,000
Yield Point (dividing method)						
Rolled 1" and under	95,000	75,000	60,000	55,000	45,000	40,000
Rolled 1" and over	95,000	75,000	60,000	55,000	45,000	40,000
Rolled or Forged, over 1"	95,000	75,000	60,000	55,000	45,000	40,000
Elongation in 2"—%						
Rolled 1" and under	10	12	14	15	20	25
Rolled or Forged	10	12	14	15	20	25
Reduction in area—%						
Rolled 1" and under	12	14	15	20	25	25
Rolled or Forged	12	14	15	20	25	25
COMPRESSION						
Yield Point—						
lbs. per sq. in.	70,000	65,000	58,000	50,000	40,000	35,000
Permanent set at 100,000 lbs. per sq. in. (max.)	.015	.020	.030	.050	.080	.125
Brinell hardness, No.	230	240	270	300	375	400

List of U. S. Government Specifications Covering HY-TEN-SL Bronze

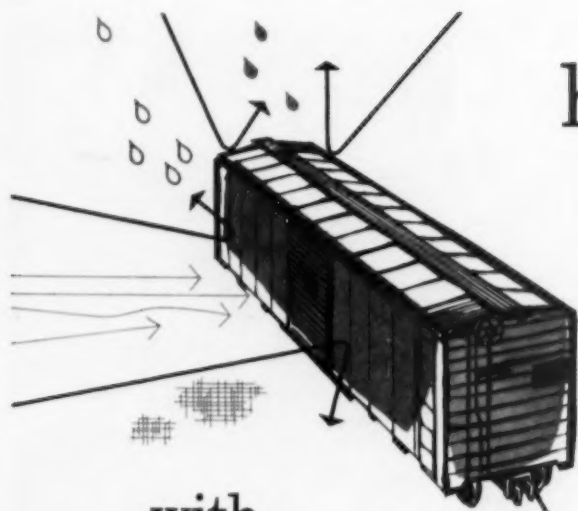
ARMY	WATERTOWN and OTHER ARMY
Forgings, Rolled Rod QQ-B-721 Class B	ARSENALS
Castings...QQ-B-726 Class B and C	Castings.....WXS-5
	Forgings and Rolled Rod.....WXS-2
NAVY	NAVAL GUN FACTORY
Forgings and Rolled Rod 46B15d Class B	Washington Navy Yard
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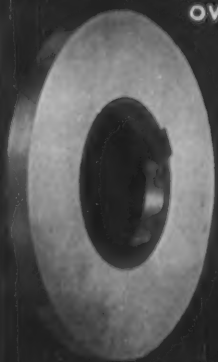
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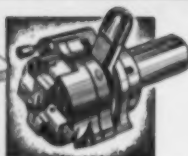
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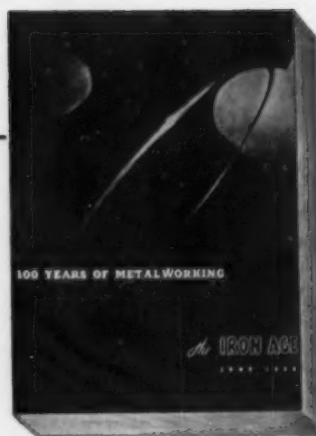
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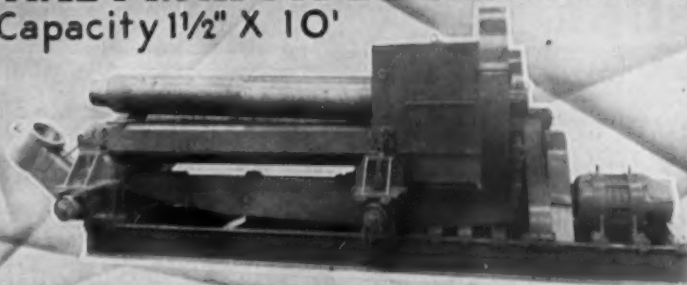
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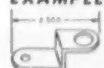
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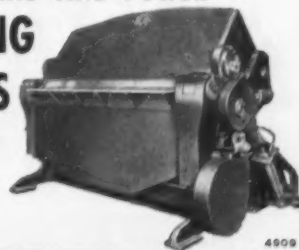
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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Sales Cheer Coast . . . Optimism's the word on the West Coast. Business is good in San Francisco, better in Seattle, and best in Los Angeles.

In the southern California area one dealer summed up the market picture this way: "There's no dearth of leads to follow up, and people are buying." Almost every firm checked by THE IRON AGE reported lots of inquiries, with a good percentage of them ending up in sales.

Behind this happy situation is the high level of industrial activity in the West. New and expanding metalworking plants are "busting out all over."

Want Late Models . . . Heaviest demand is for late-model tools in good condition. Dealers say the supply is somewhat limited in the machine tool categories, but they're able to get all the sheet metal equipment they need. In a few cases, dealers are going east of the Rockies to get what they need. Punch presses are especially hard to get, they say.

Several dealers in southern California are frank to admit some softening in prices during the past month. They say the customer demand for better quality used tools is causing a slight easing in the price of older equipment moving off dealers' floors.

Hottest items in sheet metal equipment are big presses and press brakes. And there's good demand for shears, too. Heating and ventilating industries, home building, electronics, and aircraft are still the top customers for sheet metal equipment.

Welding Sales Hold . . . The welding equipment picture remains unchanged for more than a half year now: lighter equipment is moving well, mostly sold in conjunction with sheet metal equipment, while heavier welding machinery is very slow-paced.

In San Francisco standard tools—lathes, milling machines, radial drills, drill presses, saws, and any other equipment usable in any job shop—are moving better than production machines.

Better quality machines are in stronger demand than run-of-the-mill equipment. Prices are holding fairly steady and there are no shortages.

Dealer Sees Gain . . . One dealer, after rubbing his crystal ball, came up with the prediction that 1955 will wind up about 5 pct ahead of 1954. He said that's about the margin of gain his firm has been enjoying so far this year.

Another dealer, who says business so far this year is only about neck-in-neck with 1954, entertains hopes of winding up this year with a gain of 10 pct or better.

Dealers in the Seattle-Tacoma area agree that demand is very good. One dealer reports demand now is much steadier than the first of the year, with larger firms looking for equipment.

As for supply, there's some difference of opinion. Most dealers report there is either a shortage of metalworking machinery or that it is just about holding its own against demand. One dealer said his supply is adequate. Reason given for the shortage: there aren't the same number of the big, old - established manufacturers around this area that there are in the East. Such outfits, dealers say, are dependable sources of supply.

Items particularly in demand now are lathes, drill presses, boring mills, radial drills, brakes, and shears.

Outlook for the next few months is good, with several new, small companies getting into business and being unable to finance new equipment. In addition, established firms now are getting new contracts and finding the need for original or replacement equipment to step up production.

THE CLEARING HOUSE

CONSIDER GOOD USED EQUIPMENT FIRST

ANGLE BENDING ROLL

4 x 4 x 1/2" Bertach Angle Bending Roll, M.D.

BENDING ROLLS

8" x 1/2" Bertach Initial Type
8" x 1/2" Webb 9L-2 Initial Type
12" x 1/2" Hillis & Jones Pyramid Type
14" x 1/2" Williams & White Pyramid Type
16" x 1/2" Bertach Initial Type Bending Roll
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BRACKS—LEAF TYPE

8" x 1/2" Dreis & Krump Size 190
12" x 1/2" Dreis & Krump Motor Driven
16" x 1/2" Dreis & Krump No. 288

BRACKS—PRESS TYPE

12" All Steel Press Brake, 250 ton Capacity
Cincinnati All Steel Press Brake 10"x1/2"

CAN FULLER

Clyde Double Drum Electric Car Puller, Capacity 48,750# Max. Starting Pull

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H Trer-Lift 20' Span 220/440 A.C.
5 ton Northern 57' Span 220/3/60 A.C.
5 ton Toledo 60' Span 220 Volt D.C.
7 1/2 ton Cleveland 96' Span 220 Volt D.C.
7 1/2 ton Shepard-Niles 22' Span 220/3/60 A.C.
10 ton P&H 35' Span 220 Volt D.C.
10 ton Shaw 72' Span 220 Volt D.C.
15 ton OBT 45' Span 220/3/60 A.C.
15 ton Shaw 72' Span 220 Volt D.C.
25 ton P&H 60' Span 220 Volt D.C.
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25 ton Henry & Wright, 1 1/2" Stroke, Double Roll Feed, Herap Shear

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50,000# Standard Double Draw, 48" Length of Draw
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1" 1 1/2", 2 1/2" Acme
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52" Astma Standard 17 Rolls 2 1/2" Dia.
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35 ft. Southark, Capacity 1 1/2"
25 ft. Hillis & Jones, Capacity 1 1/2" Plate

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500 ton Wood 4-Columns, 24" Stroke, 73" x 96" Between Columns
1200 ton Birdsboro 4-Columns, 20" Stroke 20" x 34" Between Columns

PRESSES—INCLINABLE

2 1/2" A Niagara, 150 ton, 13" Stroke
Cleveland, 125 ton, 13" Stroke

PRESSES—STRAIGHT SIDE

2304 Bilas, 8" Stroke
2308 Bilas, 255 ton, 14" Stroke
2312 Bilas, 290 ton, 16" Stroke, Bed Area 108"x60"

PRESS—TOGGLE

750 ton Bilas-Toledo Model 181-8 Toggle Action Press.
42" Ram Stroke, 29" Blankholder Struts, Bed Area 108" x 65", Full 66", Steel Equip.

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Style EF Cleveland, 26" Throat, Punch 1 1/2" thru 1" No. 2 1/2" Buffalo Universal Ironworker
No. 1 Long & Allstatter Double End, Capacity Punch 1 1/2" thru 1", Shear 2" Rd. 5 1/2"x 1/2" Angles
Style W Cleveland Single End, 60" Throat, 312 Ton With Attachment for Dishing Heads

ROLLING MILLS

8" x 12" Blake & Johnson Single Stand Two High
10" x 14" United Three Stand Two High
15" x 16" Waterbury Farrel Temper Mill
14" x 20" Farrel Herringbone
16" x 20" Waterbury Farrel Single Stand 2-High
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32" x 56" Three High Breakdown Mill

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51" Bertach, 7 Rolls 10" Diameter
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15" x 1 1/2" Mackintosh-Homphill
80" x 3/4" Puls
90" x 3/4" Birdsboro

SHEARS—ANGLE

6x14" Long & Allstatter Size B
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SHEAR—BAR

89 Buffalo Bar Cutter, Capacity 8" Sq., 3 1/2" Rd.

SHEAR—GUILLOTINE

25 Hillis & Jones, Capacity 4 1/2" Round, 4" Square

SHEAR—MISC.

Lowry Shear Line, Capacity 40" x 1/2" Complete with Leveler, Conveyor, Coil Stand

SHEARS—ROTARY

2/16" Quickwork Rotary Shear, 56" Throat
1/2" Kiling #250, With Flanging Attachment
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72" x 1/2" Niagara No. K-6
10" x 10 Ga. Cincinnati
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35" Voder Slitting Line with Cutlers
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5,000 lb. Olsen Hydraulic LaCap Universal
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No. 455V Quickwork Whiting Stamping Trimmer

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300 KVA Progressive Univ. Seam Welder, 220 v. 60 cy.

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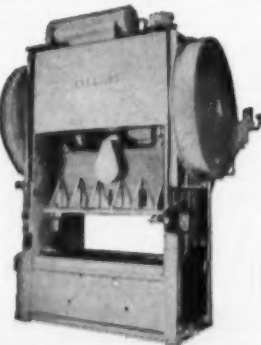
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2—#55 Buffalo Mill Type Open Throat Bar Shears, 6" Stroke, Capacity 275 Ton.

Plate Shear, "C", Long and Allstatter, 18"x1/2".

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Hillis and Jones and Buffalo Bar Shears, 1 1/2", 2", 2 1/2", 3", 3 1/2", 4", and 4 1/2".

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2	1500	Whao.	730	600	2300
1	1000	G.E.	300	350	2300
2	1000	Whao.	514	600	11,000/6000
1	500	C.W.	730	575/600	2300/440
1	500	Whao.	1200	125/250	2300
1	450	C.W.	730	250	2300/440
1	400	C.W.	1200	125/250	2300/440
1	200	G.E.	900	125/250	2300
1	300	Whao.	1500	600	2300/440
1	150	G.E.	730	250	2300/440
1	100	Whao.	900	250	2300
1	100	C.W.	1200	125	450/230
1	300	Whao.	1500	300	4160

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Qu.	H.P.	Make	Type	Volts	H.P.M.
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1	2000	Whao.	MIII	600	200/400
1	1500	Whao.	Recl.	525	000
1	1300	G.E.	MCP-6	600	350/700
4	800	Whao.	Recl.	525	000
1	800	Whao.	MIII	300	250/550
2	700	Whao.	Recl.	350	200/700
2	500	Whao.	MIII	250	200/710
1	350	G.E.	CD-100-A	230	1150
1	250	G.E.	MPC	300	300/975
1	250	G.E.	MCP	600	300/980
1	200/250	El. Dy.	#23	230	400/1200
1	200	Whao.	MIII	300	300/1200
1	200	G.E.	MDP-430	250	350/410
1	180	G.E.	MPC	250	400
1	150	Whao.	RR-201	230	300/900
1	125	Whao.	RR-184	230	575/850
1	125	Whao.	RR-190	400	600
1	125	G.E.	MPC-6	230	400/600
1	90/100	G.E.	MPC	250	425/1125
4	75	El. Dy.	#35	250	450/1350
1	75	Cont.	DI47X	230	425/1275
1	50	Whao.	RR-191.5	230	600/2300
1	40	Whao.	RR-140	230	800/1700
1	40	G.E.	CD-125	230	500/1000
1	35	Whao.	RR	230	750/1000
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1	2300	G.E.	MCP	600	400/500
2	1500	Whao.	Rev.	600	600
1	1400	G.E.	MCP	600	63/190
1	1200	G.E.	MCP	600	750/950
1	1000	G.E.	MCP	600	350/700
1	940	Whao.	QM	230	140/170
1	800	Whao.		230	450/550
1	600	Al. Ch.		250	400/800
1	500	Whao.	CC-210	600	300/900
1	500	G.E.	MUF	250	300/900
1	450	Whao.		550	415
1	250	Whao.		250	340/900
1	250	G.E.	MPC	230	400/500
1	200	Rel.	1970T	720	720
3	200	G.E.	CD-1650Z	230	500/1500
1	200	Whao.	CB-5115	230	400/800
1	150	G.E.		600	250/750
1	150	Cr. Wh.	RRH	230	1150
1	150	Cr. Wh.	RRH-TRFC	230	890
1	150	Whao.	RR-1111B	230	900/1800
1	150	Whao.	RR-201	230	360/950
1	120	G.E.	MCP	230	500/1000
1	125	Whao.	RR-181	230	500/1500
1	125	Whao.	RR-183	230	850
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1	1750/2100	G.E.	514	250/300	2300/4600
1	2000	G.E.	500	250g 660	11000
1	2000	G.E.	514	600	6000/12200
1	2000	G.E.	450	600	2300/4600
1	1500	G.E.	730	600	6000/12200
1	1500	C.W.	514	30/115	4000/13000
2	1000	G.E.	730	600	2300/4600
2	750	G.E.	730	275	2300/4600
1	750	C.W.	514	30/115	2300
1	600	G.E.	730	350	440/2300

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
2	4200	G.E.	POWTF	3	13500x115/200
1	3000	Wagner	HPW-20	3	26100x3400
3	2000	G.E.	HVDDJ	1	60000x12000
3	1000	G.E.	HVDDJ	1	3400x480
6	1000	Wagner	OTSC	1	13200x1600
3	667	G.E.	IID	1	13000x2300

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